

Hunters Point Naval Shipyard, Parcel G, RSY Data Report

Contract No. N62473-17-D-006 CTO N6247318F5065 RSY Pad Data Report									
RSY Pad: RSY 41 Use 1					Soil Origin: TU-115A SFU				
Data attached and submitted by: Amy Mangel					Data Report Submittal Date: 08/27/2021				

Systematic Soil Sample Data: RSY 41 Use 1									
Sample Identification	Sample Location	Type of Sample	Gamma Static 3x3 Nal Reading (CPM)	Gamma 3x3 Static Investigation Level (CPM)	²²⁶ Ra Final Analytical Results (pCi/g)	¹³⁷ Cs Final Analytical Results (pCi/g)	⁹⁰ Sr Final Analytical Results (pCi/g)	²³² Th Final Analytical Results (pCi/g)	²³⁹ Pu Final Analytical Results (pCi/g)
Project Remediation Goals*									
HPPG-SFU-TU115A-001	1	Systematic	8,136	16,729	0.208	0.000	0.177	0.785	-0.0121
HPPG-SFU-TU115A-002	2	Systematic	8,655	16,729	0.265	0.0206	N/A	N/A	N/A
HPPG-SFU-TU115A-003	3	Systematic	7,687	16,729	0.249	0.0111	N/A	N/A	N/A
HPPG-SFU-TU115A-004	4	Systematic	7,895	16,729	0.253	-0.00883	N/A	N/A	N/A
HPPG-SFU-TU115A-005	5	Systematic	7,327	16,729	0.330	-0.00551	N/A	N/A	N/A
HPPG-SFU-TU115A-006	6	Systematic	8,538	16,729	0.315	-0.0382	N/A	N/A	N/A
HPPG-SFU-TU115A-007	7	Systematic	8,161	16,729	0.108	-0.0325	N/A	N/A	N/A
HPPG-SFU-TU115A-008	8	Systematic	7,566	16,729	0.0298	-0.00397	N/A	N/A	N/A
HPPG-SFU-TU115A-009	9	Systematic	7,586	16,729	0.101	-0.0230	N/A	N/A	N/A
HPPG-SFU-TU115A-010	10	Systematic	7,913	16,729	0.369	0.0315	N/A	N/A	N/A
HPPG-SFU-TU115A-011	11	Systematic	8,329	16,729	0.350	-0.0308	0.196	0.249	-0.0127
HPPG-SFU-TU115A-012	12	Systematic	8,178	16,729	0.244	-0.0149	N/A	N/A	N/A
HPPG-SFU-TU115A-013	13	Systematic	7,557	16,729	0.0965	-0.000354	N/A	N/A	N/A
HPPG-SFU-TU115A-014	14	Systematic	7,529	16,729	0.229	0.000	N/A	N/A	N/A
HPPG-SFU-TU115A-015	15	Systematic	8,942	16,729	0.350	-0.0291	N/A	N/A	N/A
HPPG-SFU-TU115A-016	16	Systematic	9,232	16,729	0.404	0.0369	N/A	N/A	N/A
HPPG-SFU-TU115A-017	17	Systematic	7,583	16,729	0.258	0.00107	N/A	N/A	N/A
HPPG-SFU-TU115A-018	18	Systematic	8,361	16,729	0.349	0.00395	N/A	N/A	N/A
HPPG-SFU-TU115A-019	19	Systematic	8,309	16,729	0.322	0.0208	N/A	N/A	N/A
HPPG-SFU-TU115A-020	20	Systematic	8,265	16,729	0.415	0.0165	N/A	N/A	N/A
HPPG-SFU-TU115A-021	21	Systematic	7,352	16,729	0.203	0.0113	0.292	0.268	0.00213
HPPG-SFU-TU115A-022	22	Systematic	8,123	16,729	0.375	0.00369	N/A	N/A	N/A
HPPG-SFU-TU115A-023	23	Systematic	8,363	16,729	0.222	0.0353	N/A	N/A	N/A
HPPG-SFU-TU115A-024	24	Systematic	7,675	16,729	0.319	-0.0214	N/A	N/A	N/A
HPPG-SFU-TU115A-025	25	Systematic	7,853	16,729	0.270	0.00192	N/A	N/A	N/A
Soil Systematic Sample Statistics					²²⁶ Ra Final Analytical Results (pCi/g)	¹³⁷ Cs Final Analytical Results (pCi/g)	⁹⁰ Sr Final Analytical Results (pCi/g)	²³² Th Final Analytical Results (pCi/g)	²³⁹ Pu Final Analytical Results (pCi/g)
Maximum					0.415	0.0369	0.292	0.785	0.0021
Mean					0.2654	-0.0006	0.2217	0.434	-0.0076
Median					0.265	0.000	0.196	0.268	-0.0121
Minimum					0.0298	-0.0382	0.177	0.249	-0.0127
Standard Deviation					0.1011	0.0211	N/A	N/A	N/A

Biased Soil Sample Data: RSY 41 Use 1									
Sample Identification	Sample Location	Type of Sample	Gamma Static 3x3 Nal Reading (CPM)	Gamma 3x3 Static Investigation Level (CPM)	²²⁶ Ra Final Analytical Results (pCi/g)	¹³⁷ Cs Final Analytical Results (pCi/g)	⁹⁰ Sr Final Analytical Results (pCi/g)	²³² Th Final Analytical Results (pCi/g)	²³⁹ Pu Final Analytical Results (pCi/g)
Project Remediation Goals*									
HPPG-SFU-TU115A-B-001	1	Biased	9,442	16,729	0.562	0.0324	0.143	0.403	-0.0256

CPM Counts per minute

pCi/g Picocuries per gram

* Note: Project Remediation goal (RG) is the Record of Decision RG or Offsite RBA value, whichever is higher

Instrument and Survey Summary					
Activity	Survey #	Date	Meter	Calibration Due Date	Serial #
Gamma Walkover Survey	HPRS-06092021-PG-ROV-630	06/09/2021	RS-700	03/31/2022	5447/5448
Follow-Up Static Survey	HPRS-06102021-PG-JSS-640	06/10/2021	RS-700	03/31/2022	5447/5448
Systematic Sample Survey	HPRS-06112021-PG-JSS-649	06/11/2021	3x3	05/12/2022	117336
Biased Sample Survey	HPRS-06152021-PG-JSS-669	06/15/2021	3x3	05/12/2022	271420

Region of Interest (ROI) Summary	
ROI	Nuclide and Energy
ROI 3	Ra-226 (1764 keV)
ROI 4	Th-232 (2614 keV)
ROI 6	Ra-226 (609 keV)
ROI 7	Cs-137 (662 keV)
ROI 8	Ra-226 (351 keV)
ROI 10	Gross Gamma

Summary: RSY 41 Use 1
1) Gamma walkover survey and data review—upon review of initial RS-700 scan data in accordance with Final Parcel G Work Plan Section 3.5.1.1, 42 follow-up static investigations were required. Gamma scan data summary statistics, normal Q-Q plots, histograms, and box plots are provided on pages 3-6. Contour maps of the scan data for the ROIs of interest are presented on page 7. The RSY scan data was lower than the background scan data. The exact same RS-700 and detectors were used for the background data collection and the RSY pad data collection.
2) One-minute static follow-up measurements with the RS-700 were collected at 42 gamma walkover investigation locations in accordance with Final Parcel G Work Plan Section 3.3.1. A map of the follow-up locations is presented on page 9. The net follow-up static spectra are presented on pages 14-55. The exact same RS-700 and detectors were used for the background data collection and the RSY pad data collection.
3) In accordance with Final Parcel G Work Plan Section 3.4.1, twenty-five systematic soil samples (001-025) were obtained and submitted for gamma spectroscopy analysis. Sample locations are shown on the Systematic Sample Survey map (page 10). TestAmerica sample results are attached (pages 56-92). Ten percent of the systematic soil samples (three samples in total -001, -011, & -021) were also analyzed for strontium-90, as well as plutonium-239 and thorium-232 via alpha spectroscopy. Strontium-90, thorium-232, and plutonium-239 results are also included in the TestAmerica sample results report (pages 56-92). Samples HPPG-F-075 and HPPG-F-076 are field duplicates, correlating to systematic samples -002 and -016. The Data Quality Assessment which will be included in the RACR will provide an analysis and discussion of field duplicates for the project. The Instrument and Survey Summary table above lists the 3x3 NaI detector used for the gamma static measurements collected during sampling activities, and the instrument-specific gamma static IL listed in the sample tables on page one is developed from that instrument's RBA data.
Systematic sample histograms, box plots, Q-Q plots, and power curves are provided on pages 12-13. All sample results were below the applicable RGs. The number of samples collected was sufficient to meet project DQOs.
4) In accordance with Final Parcel G Work Plan Section 3.3.1 and 3.4.1, one biased sample was collected since all follow-up static measurements were below the ROC-specific critical levels. The biased sample was collected from the location of the highest gross gamma scan measurement. TestAmerica sample results are attached (pages 93-110). A map of the biased sample location is presented on page 11. Biased sample results were all below the applicable RGs.
Conclusions: In accordance with the DQOs in Section 3.1 of the Final Parcel G Work Plan, final analytical results for all samples from the RSY pad were shown by a point by point comparison to meet the RGs. Graphical comparisons demonstrated that ROC concentrations were consistent with background. RSY 41 Use 1 contains soil from Hunters Point Naval Shipyard Parcel G Phase 1 excavation TU-115A SFU. APTIM requests RASO concurrence to release this soil as Non-LLRW. Disposition: This soil shall be used as backfill for TU-115.

Soil Scan Statistics

Statistical Summary

Dataset		PG-RSY-41-U1				
ROI		Minimum (cps)	Maximum (cps)	Mean (cps)	Median (cps)	Standard Deviation (cps)
ROI-03		1.00	23.04	9.37	9.02	3.15
ROI-04		2.00	26.05	10.77	10.02	3.71
ROI-06		37.07	114.21	67.06	66.14	10.22
ROI-07		27.05	84.18	52.04	51.11	8.50
ROI-08		53.12	126.25	85.61	85.17	12.01
ROI-10		1,438.05	2,176.72	1,773.57	1,763.12	130.74

Statistical Summary Reference Background

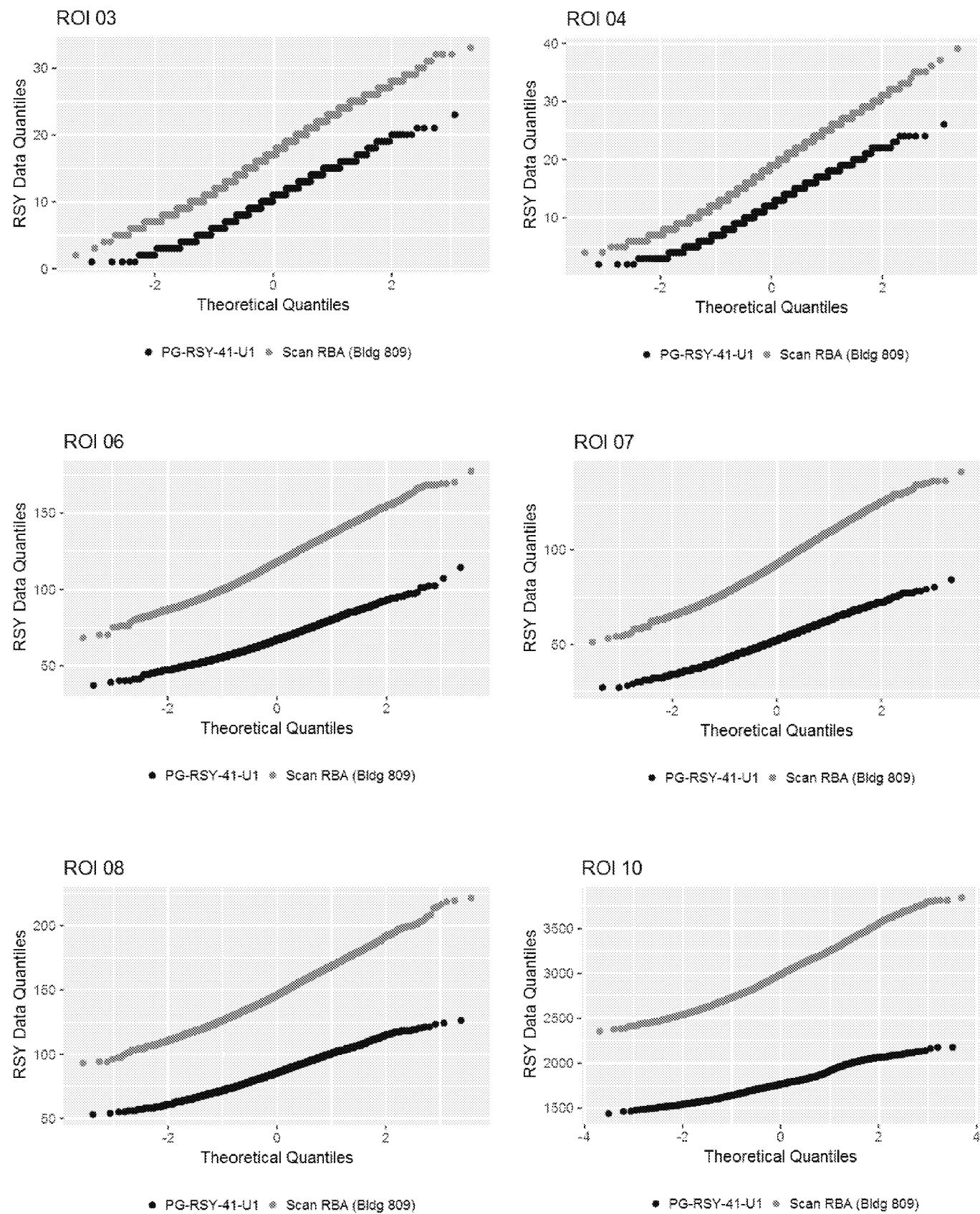
TYPE	Scan RBA (Bldg 809)					
	ROI	Minimum (cps)	Maximum (cps)	Mean (cps)	Median (cps)	Standard Deviation (cps)
	ROI-03	2.00	33.08	16.21	16.04	4.13
	ROI-04	4.01	39.08	17.52	17.04	4.89
	ROI-06	68.15	177.45	117.58	117.26	15.50
	ROI-07	51.11	141.33	92.34	91.24	13.43
	ROI-08	93.19	221.48	146.24	145.30	18.21
	ROI-10	2,354.11	3,845.31	2,995.57	2,989.64	255.66

cps = counts per second

Dataset	Number of Data Points
PG-RSY-41-U1	2387
Scan RBA (Bldg 809)	4705

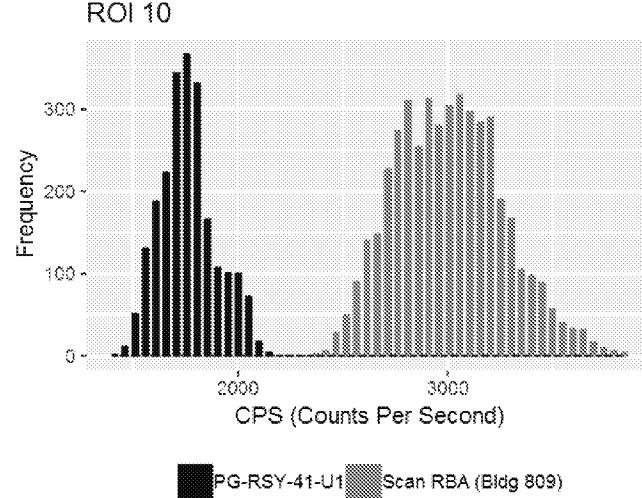
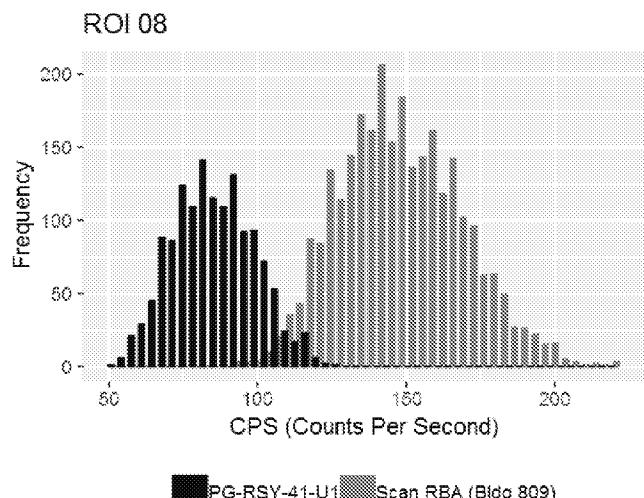
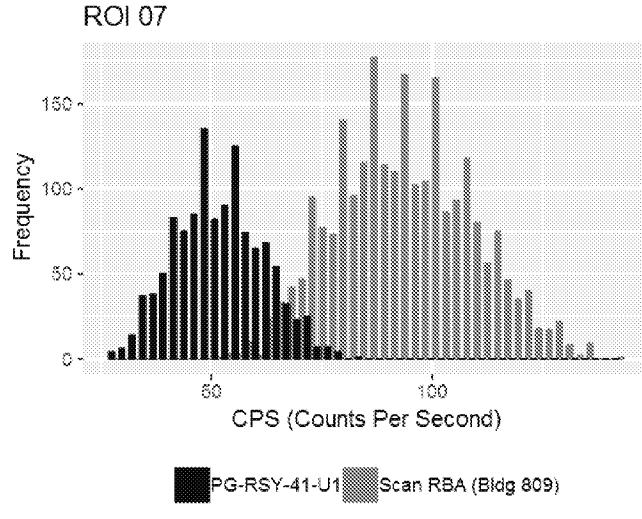
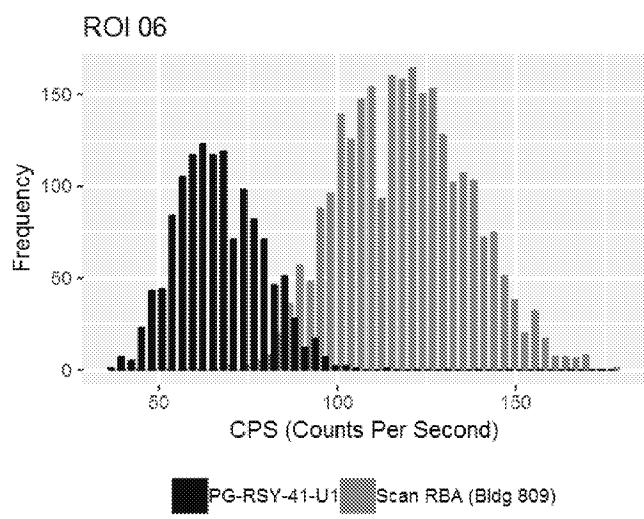
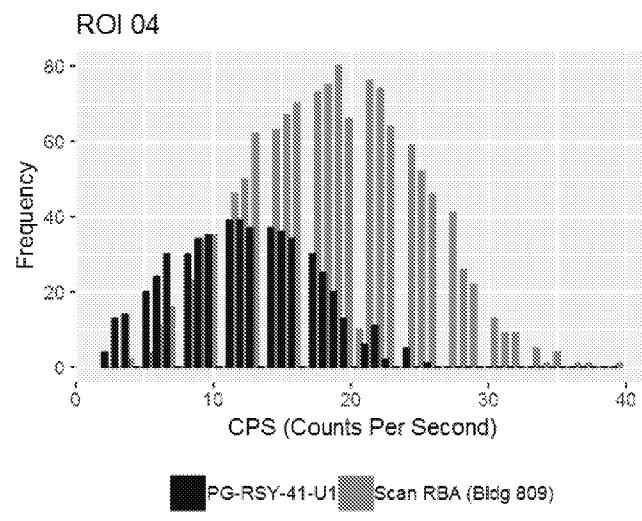
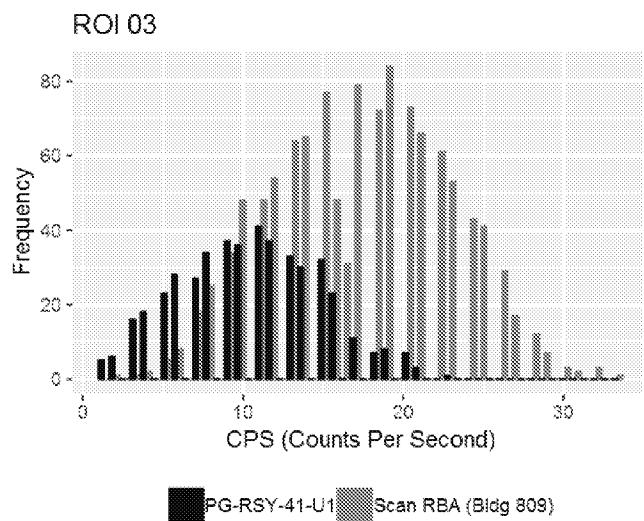
Soil Scan Statistics

Normal Q-Q Plots



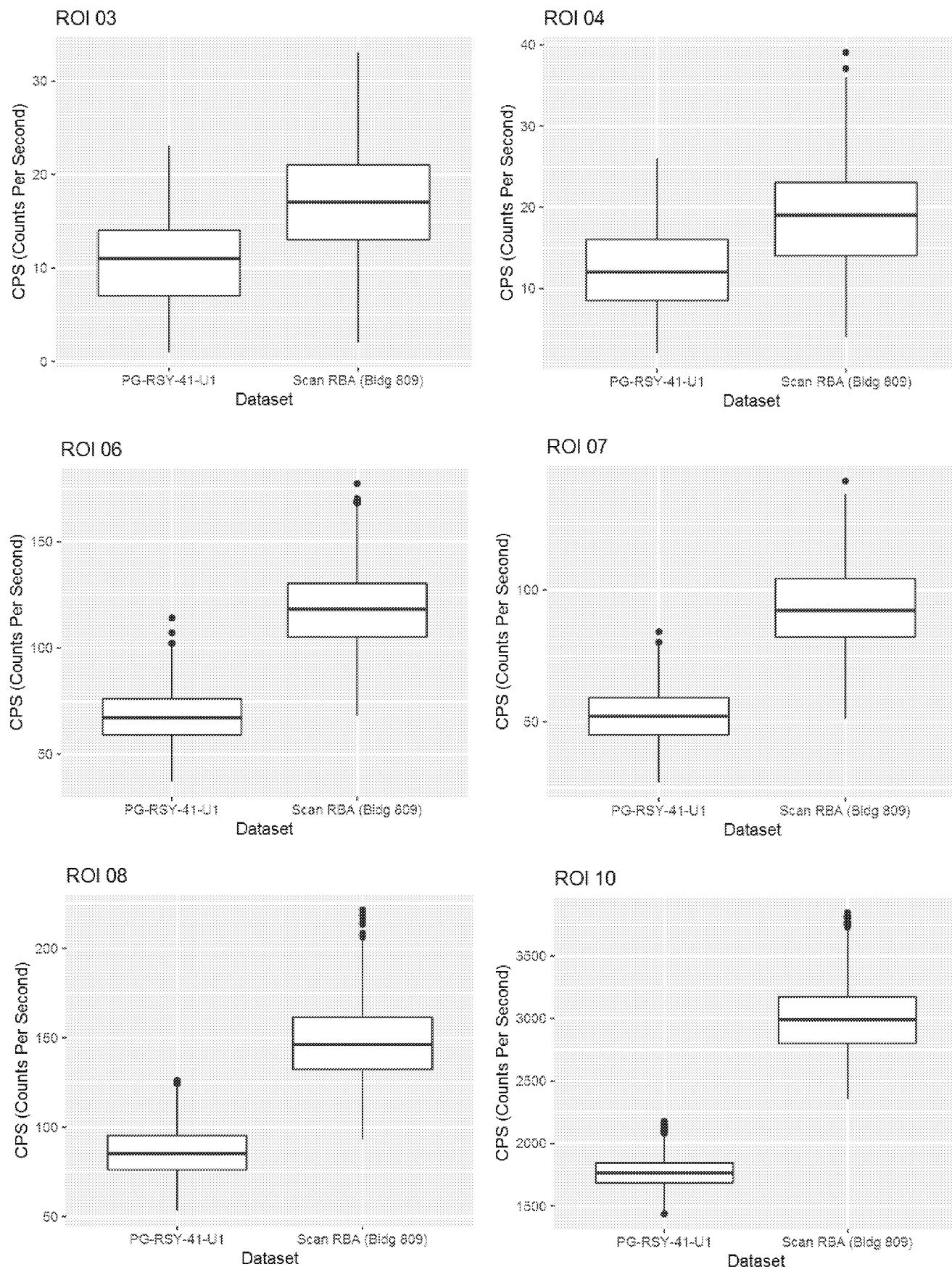
Soil Scan Statistics

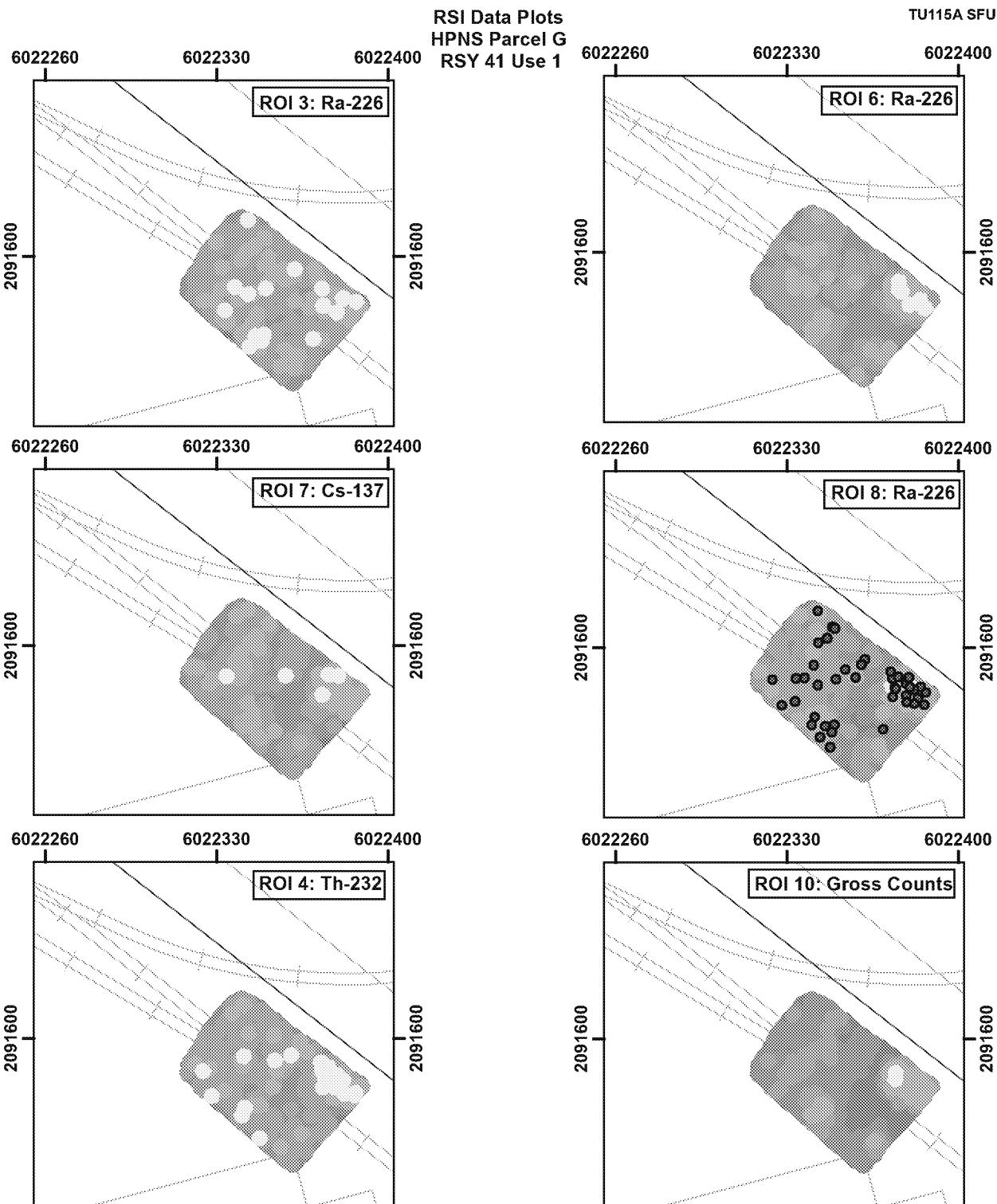
Histograms



Soil Scan Statistics

Box Plots





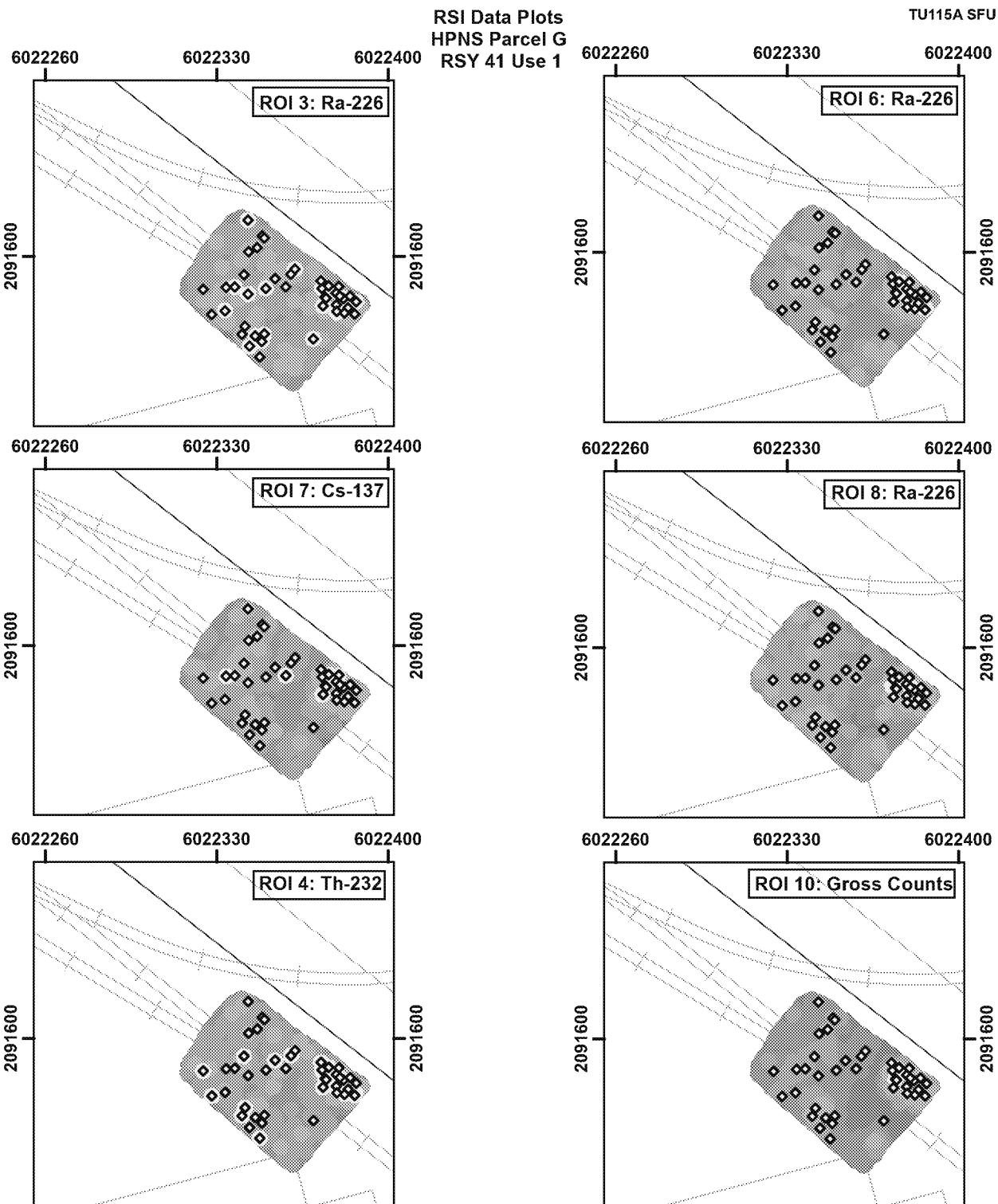
RS 700 Gamma Walkover Survey Data (VD1)

- | | |
|--------------------|----------------------|
| > 3 std dev | > -1 to < 0 std dev |
| ● | ● |
| > 2 to < 3 std dev | > -2 to < -1 std dev |
| ● | ● |
| > 1 to < 2 std dev | > -3 to < -2 std dev |
| ● | ● |
| > 0 to < 1 std dev | < -3 std dev |
| ● | |

0 25 50 100 Feet

Coordinate system: CSP Zone III, NAD83, US Survey Foot





RS 700 Gamma Walkover Survey Data (VD1)

- ◆ Follow-Up Locations
- > 3 std dev
- > 2 to < 3 std dev
- > 1 to < 2 std dev
- > 0 to < 1 std dev
- > -1 to < 0 std dev
- > -2 to < -1 std dev
- > -3 to < -2 std dev
- < -3 std dev

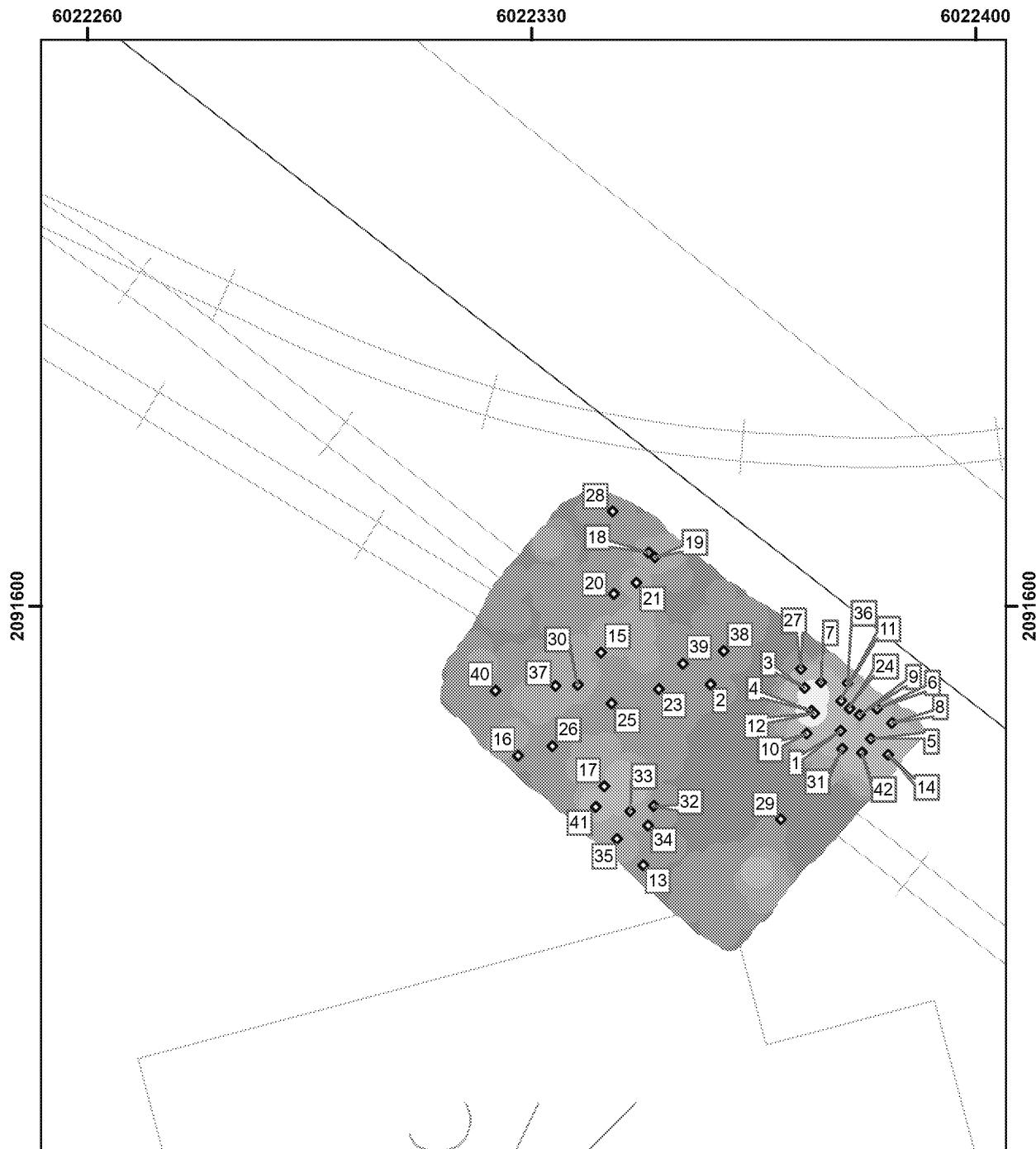
0 25 50 100
Feet

Coordinate system: CSP Zone III, NAD83, US Survey Foot



Follow-Up Static Survey
HPNS Parcel G
RSY 41 Use 1

TU115A SFU



RSY 41 Use 1 (VD1, ROI 10 Gross Gamma)

- ◆ Follow-Up Locations
- > 1 to < 2 std dev
- > -2 to < -1 std dev
- > 3 std dev
- > 0 to < 1 std dev
- > -3 to < -2 std dev
- > 2 to < 3 std dev
- > -1 to < 0 std dev
- < -3 std dev

25 12.5 0 25 Feet

Coordinate system: CSP Zone III, NAD83, US Survey Foot



APTIM

Systematic Sampling
HPNS Parcel G
RSY 41 Use 1

TU115A SFU



RSY 41 Use 1

S Systematic Sample Locations

RS-700 GWS Coverage

0 10 20 40 Feet

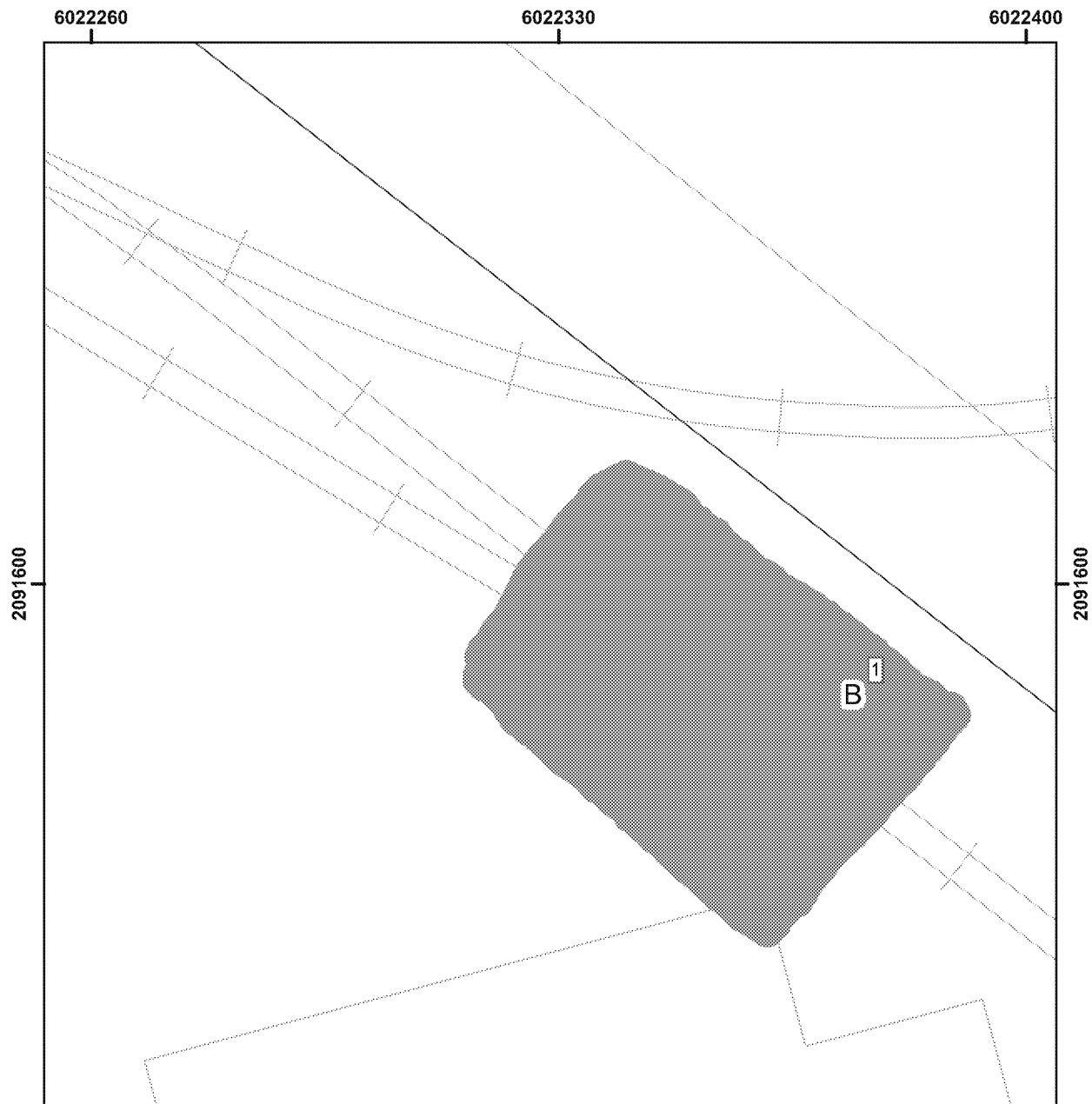
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APTIM

Biased Sampling
HPNS Parcel G
RSY 41 Use 1

TU115A SFU



RSY 41 Use 1

B Biased Sample Location

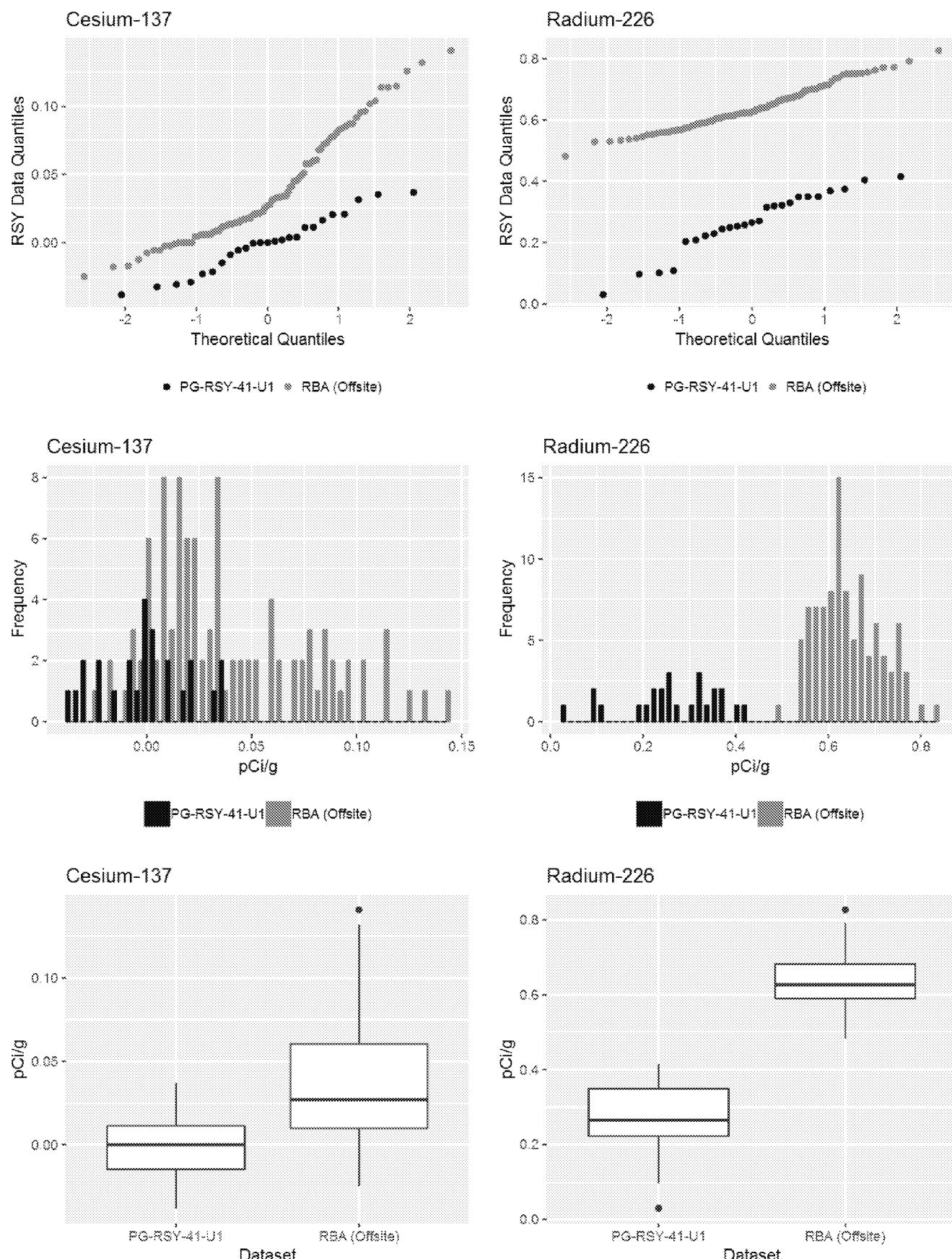
RS-700 GWS Coverage

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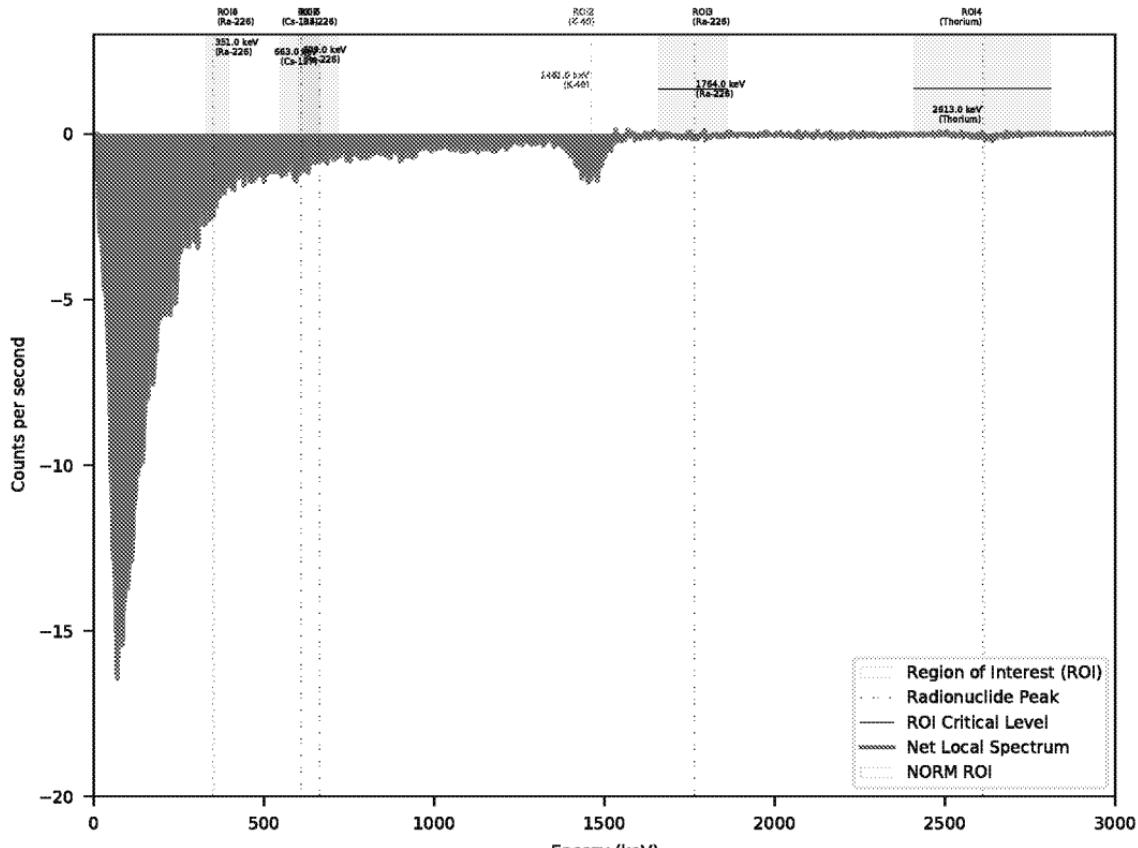
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Soil Sample Statistics

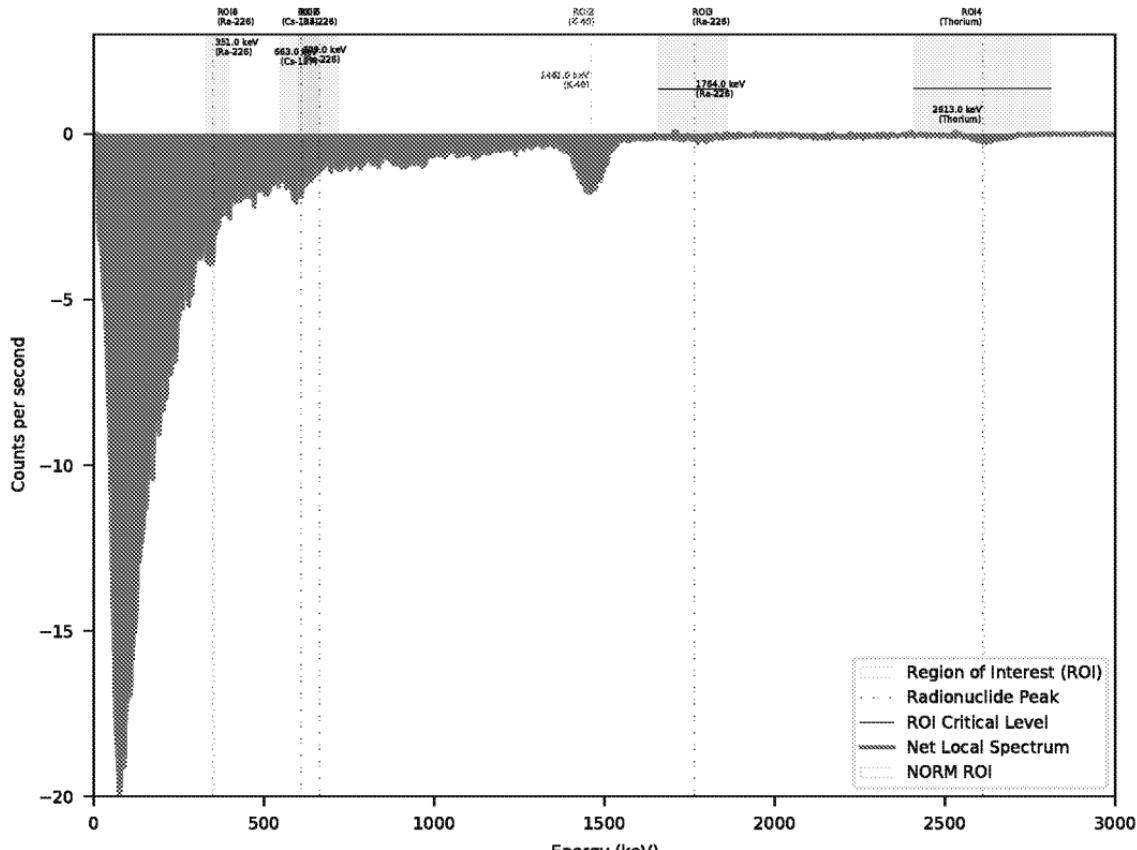


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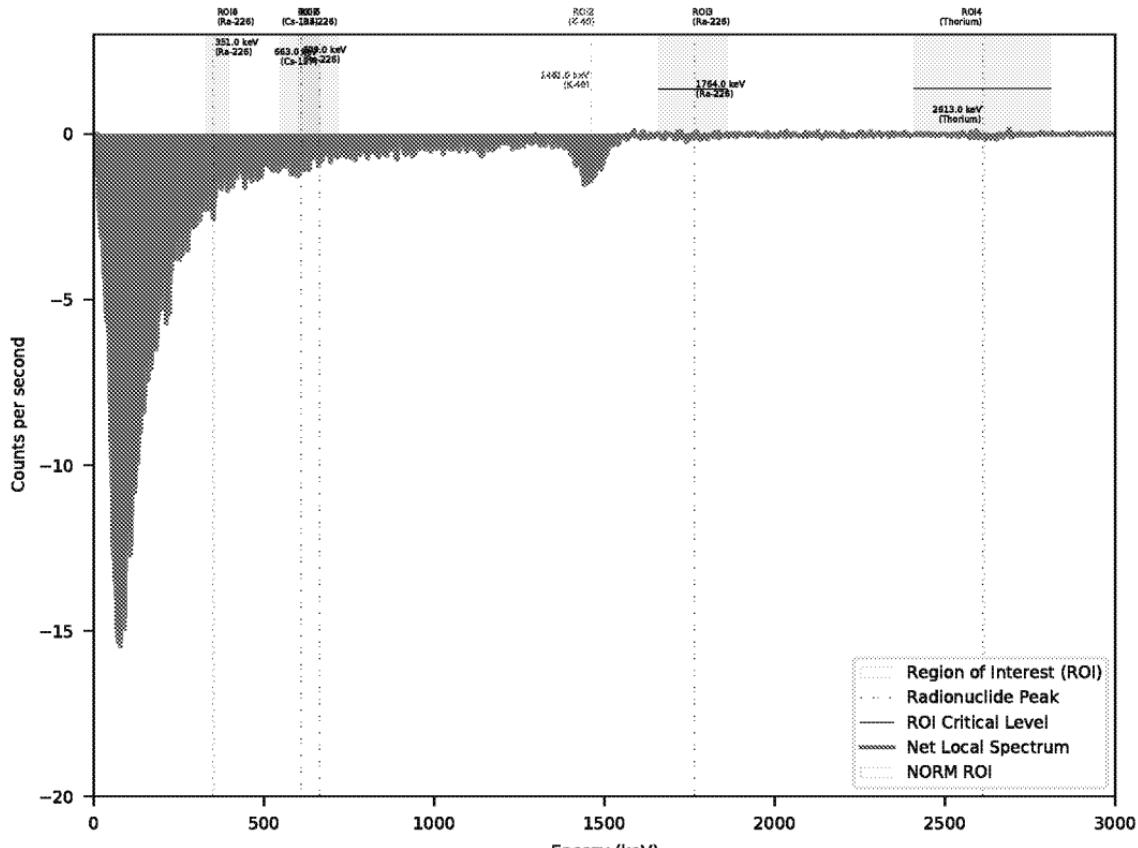


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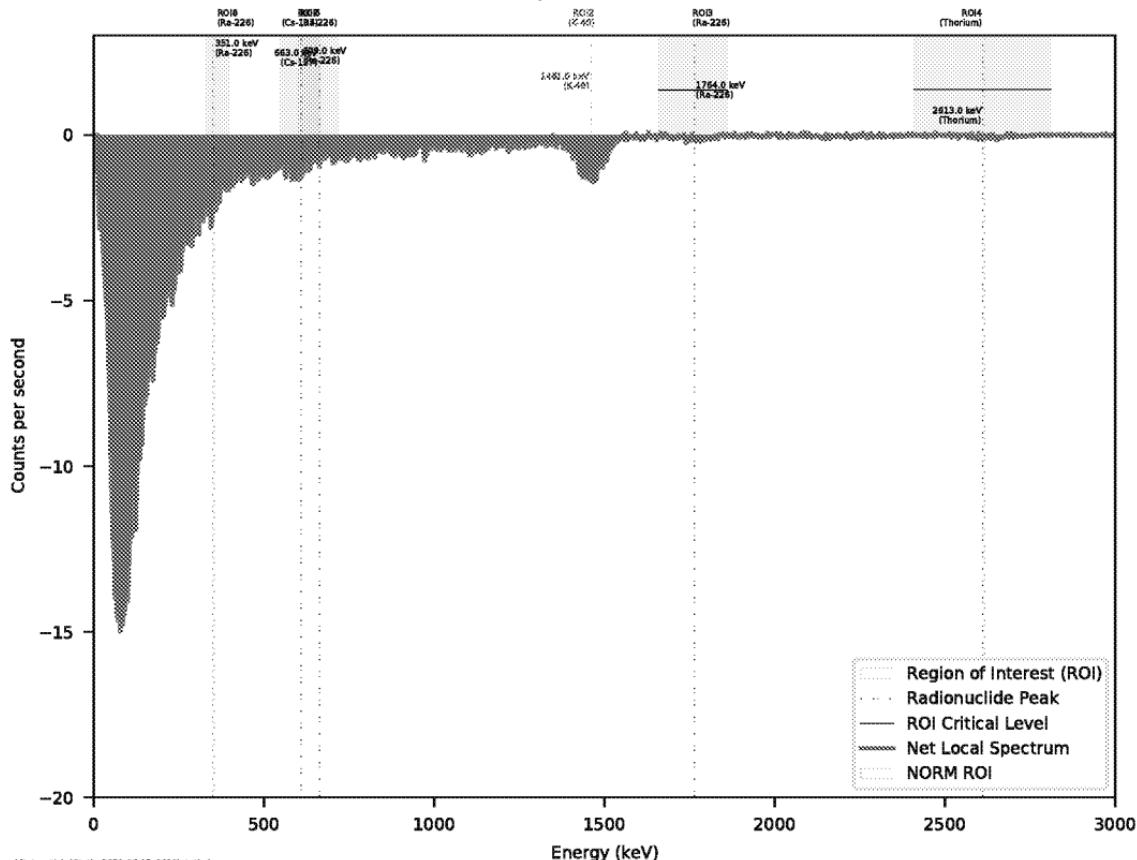
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Net Gamma Spectrum, Static Location: 3



ED_006360A_00000151-00016

Net Gamma Spectrum, Static Location: 4

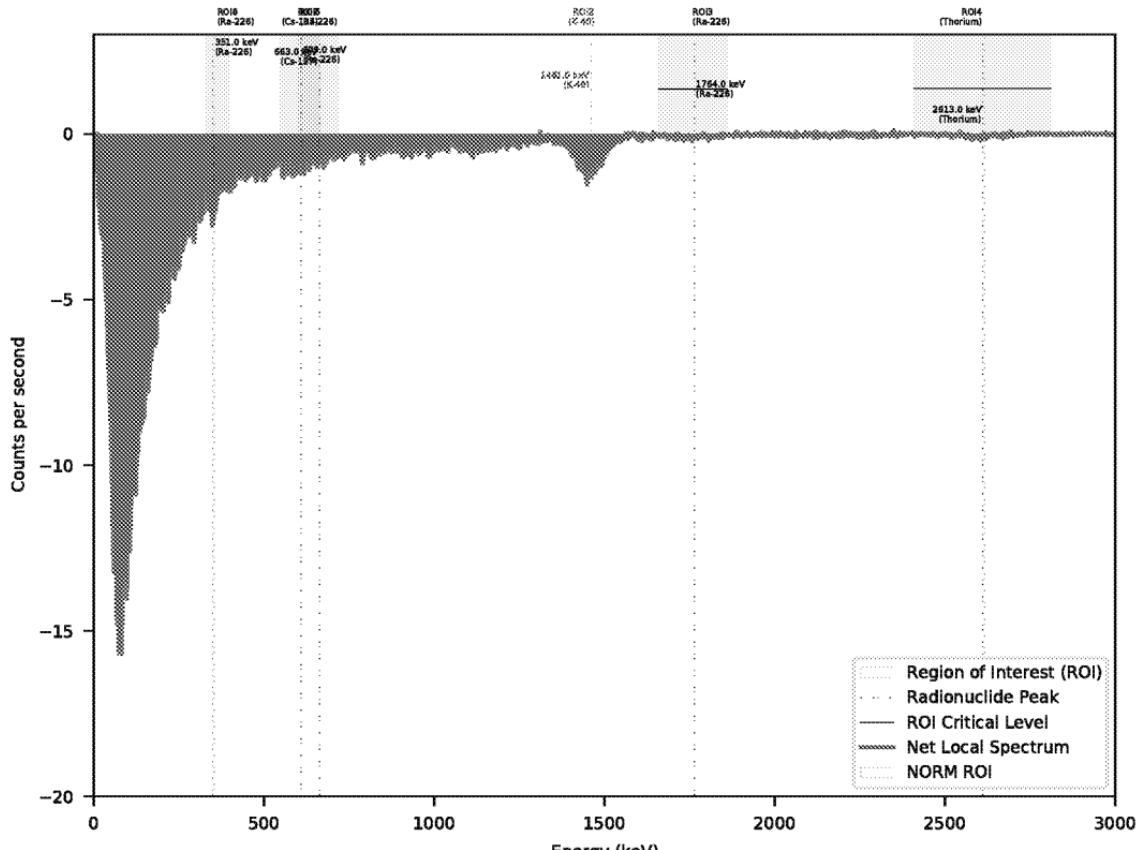


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Net Gamma Spectrum, Static Location: 5

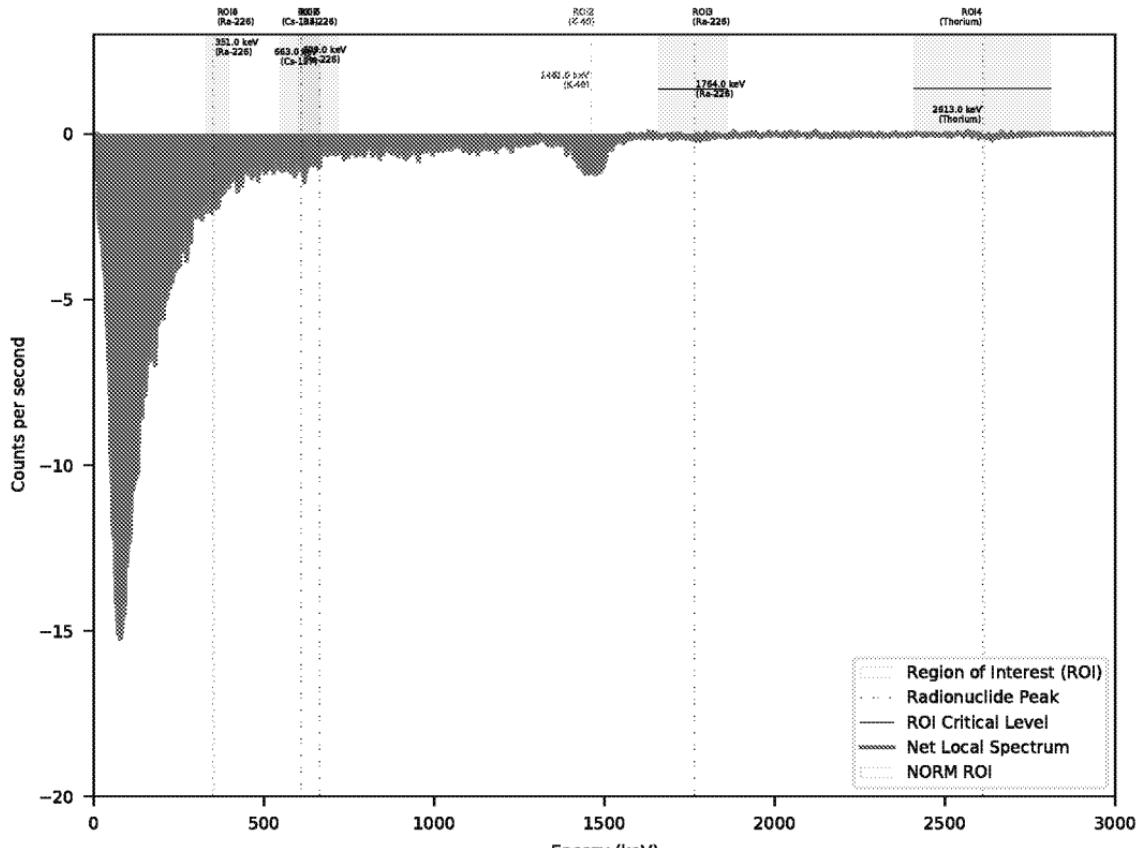


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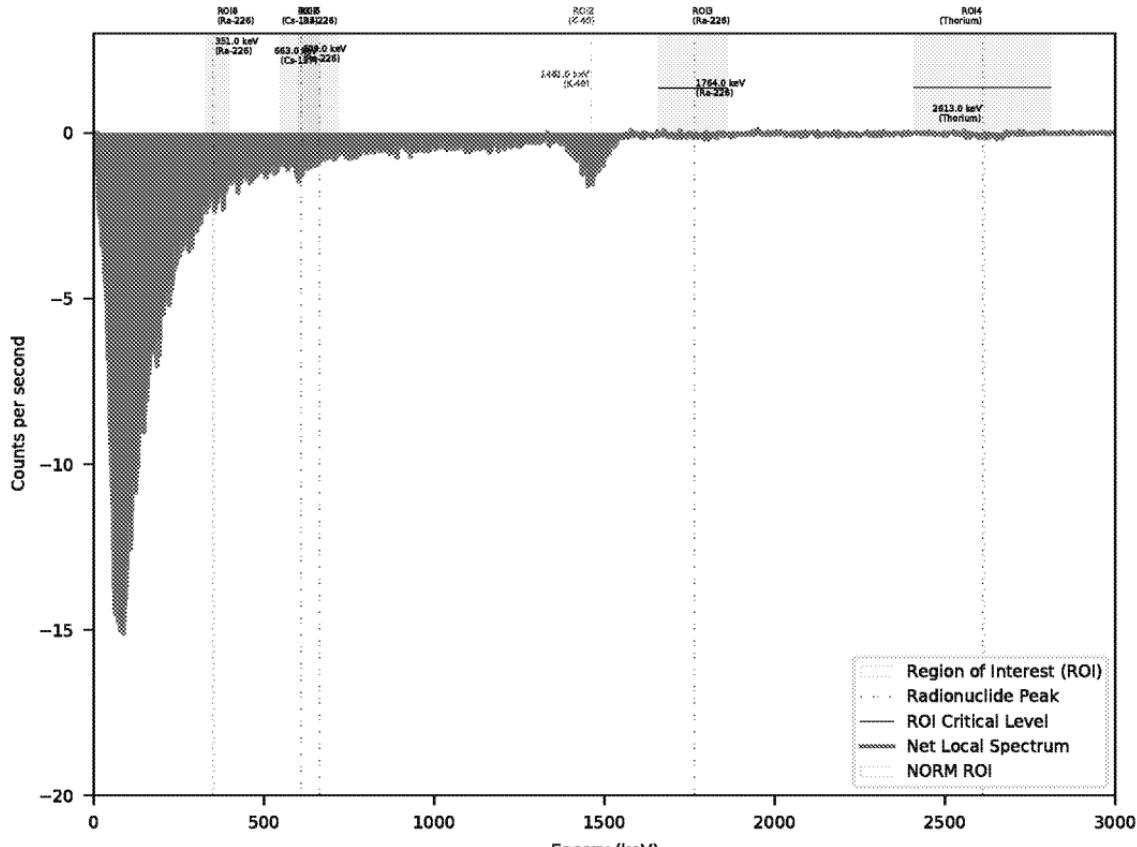
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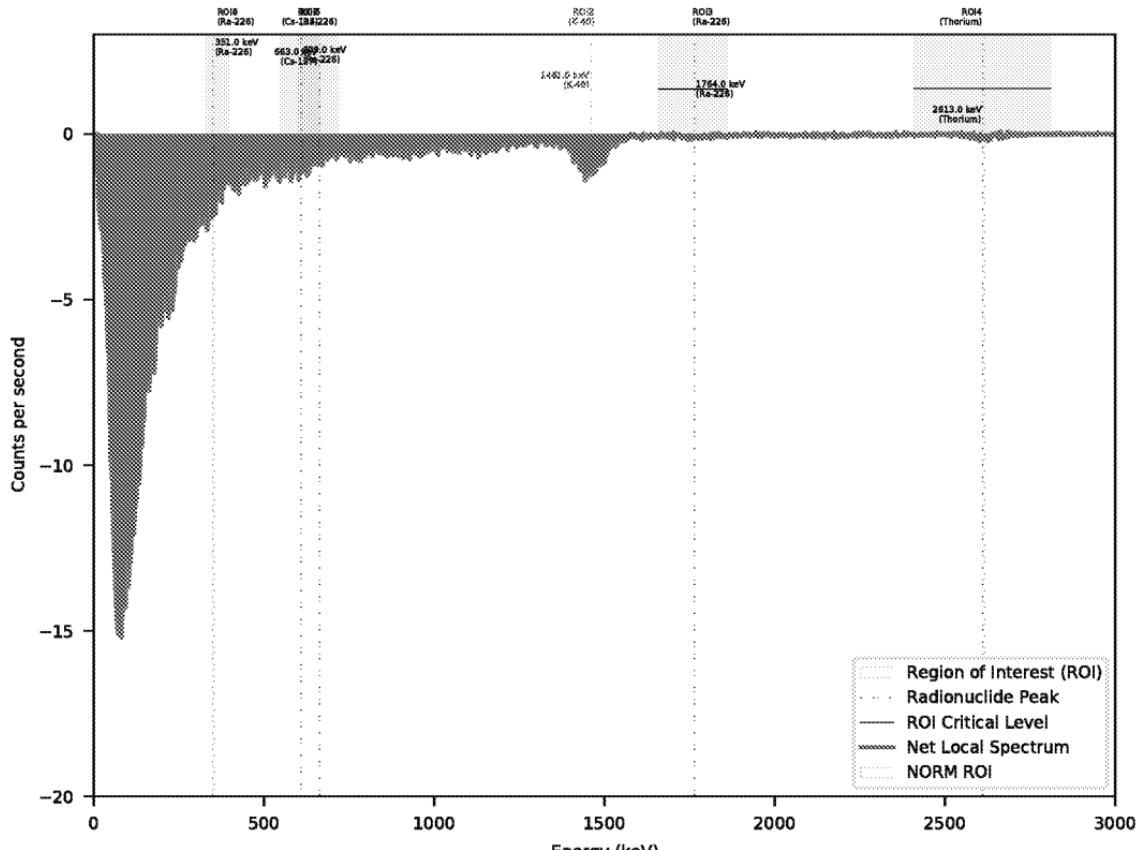
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Net Gamma Spectrum, Static Location: 7



ED_006360A_00000151-00020

Net Gamma Spectrum, Static Location: 8

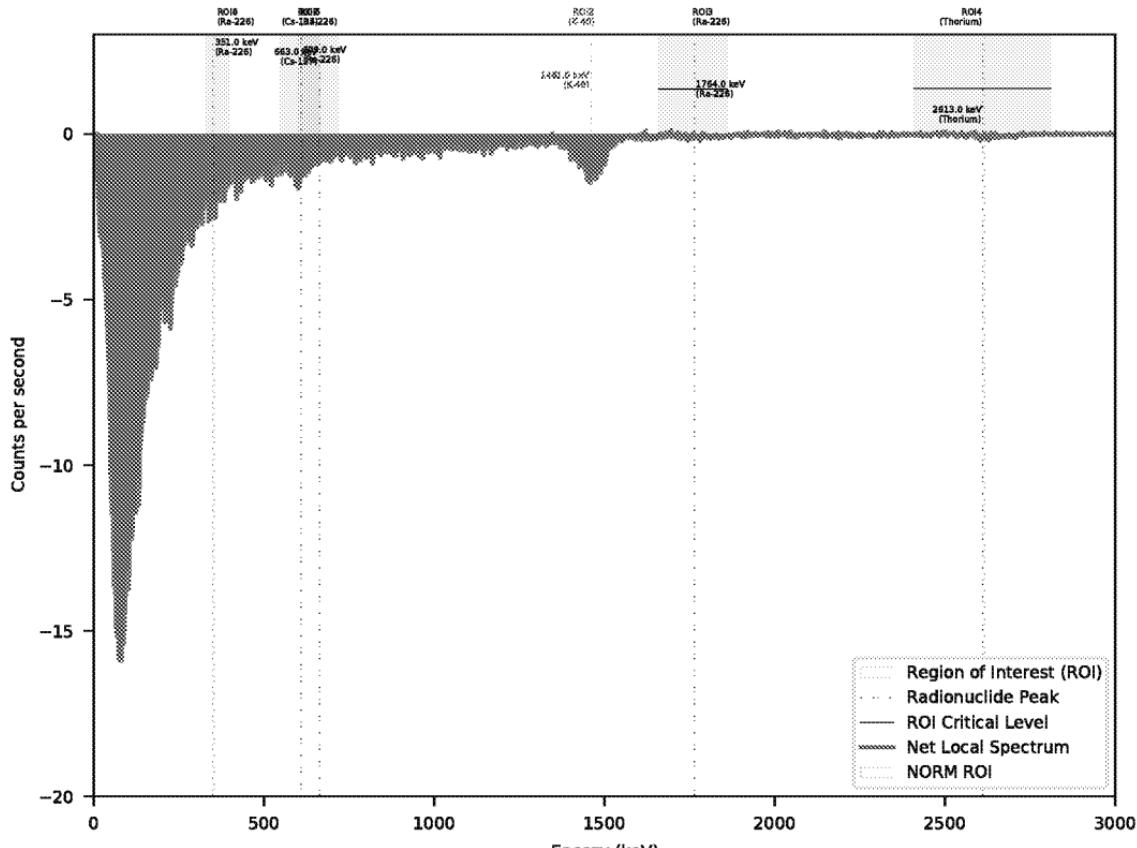


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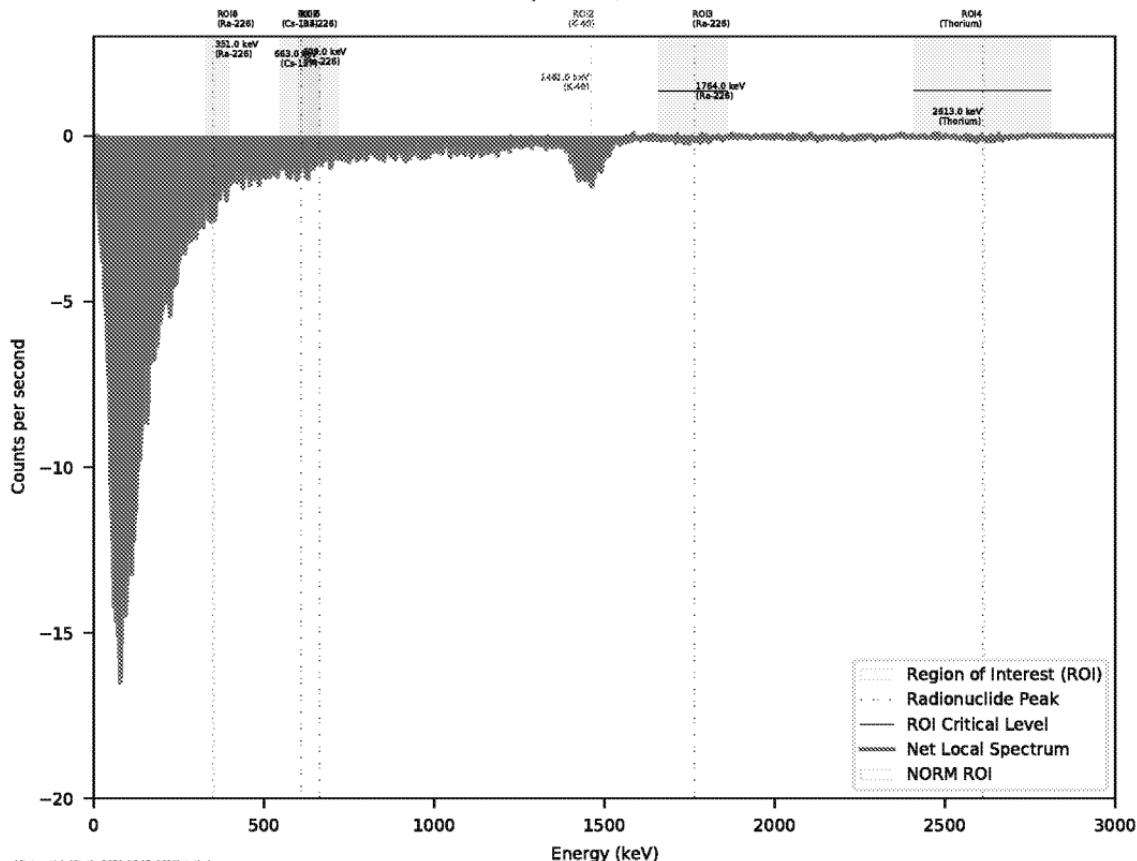


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Net Gamma Spectrum, Static Location: 10

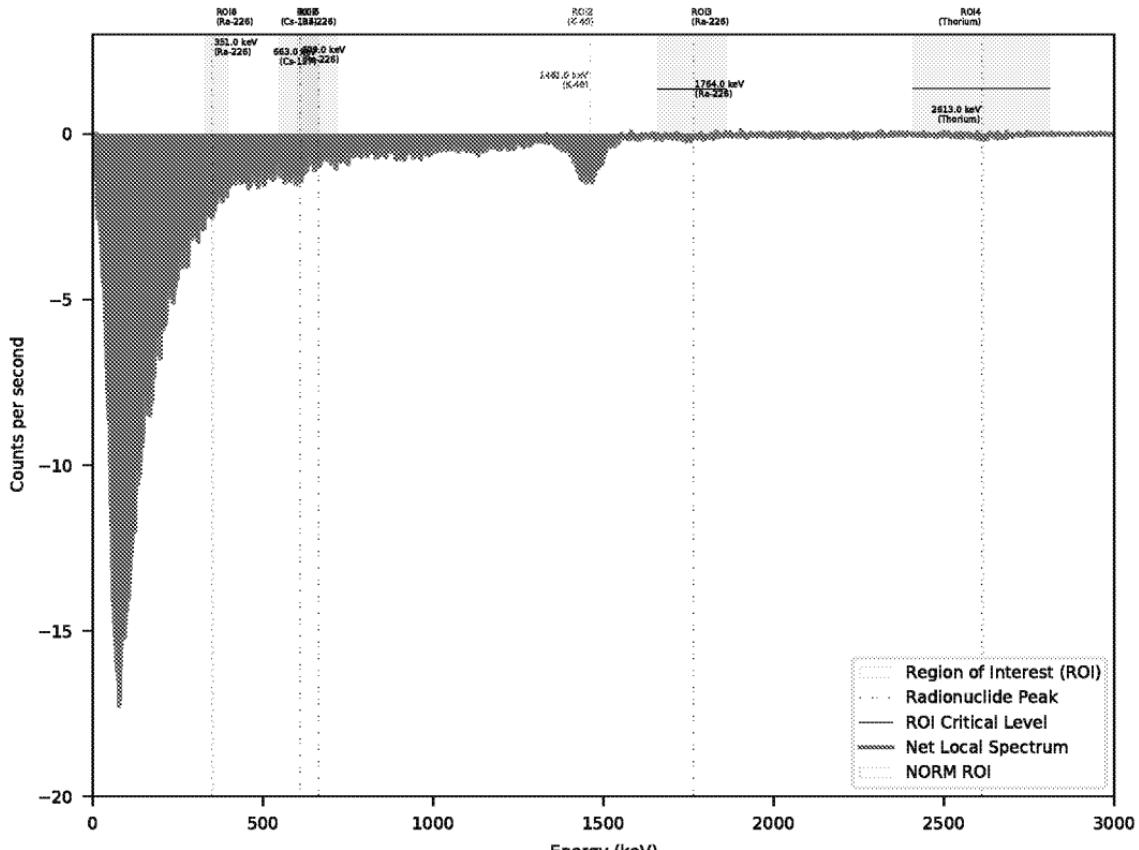


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Net Gamma Spectrum, Static Location: 11

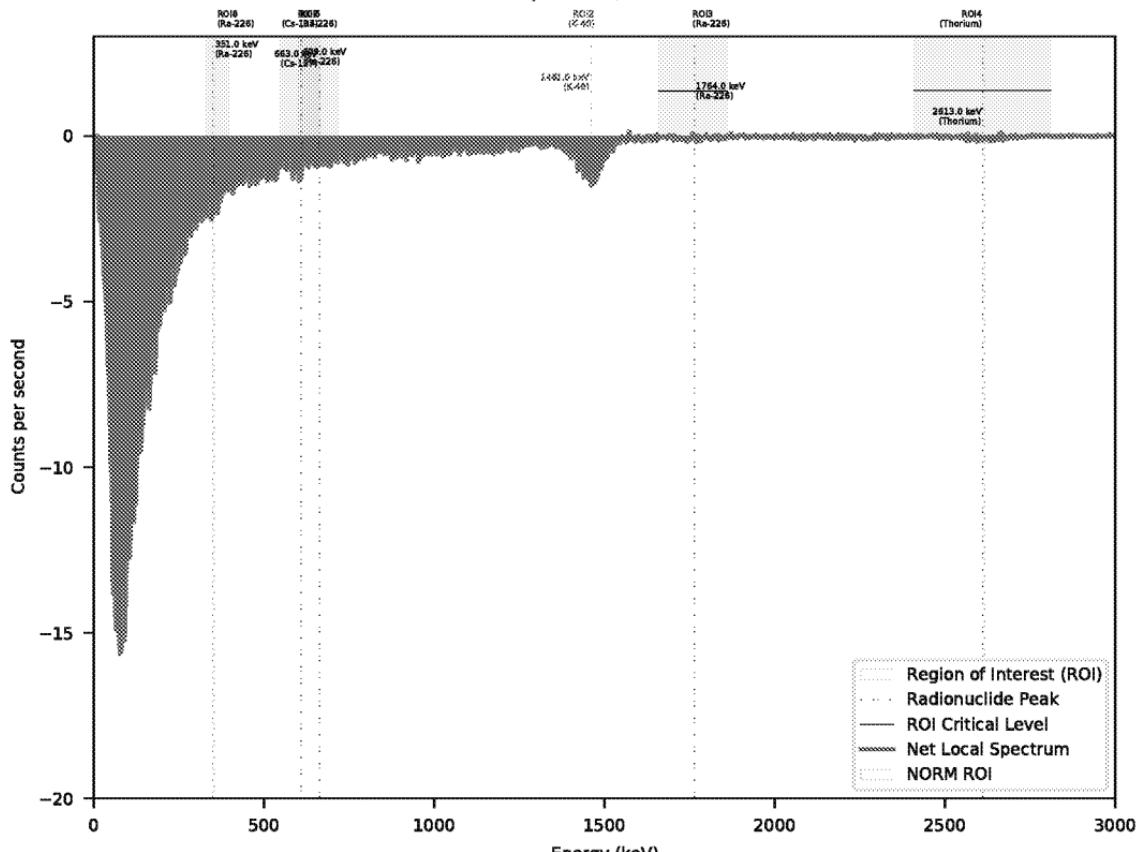


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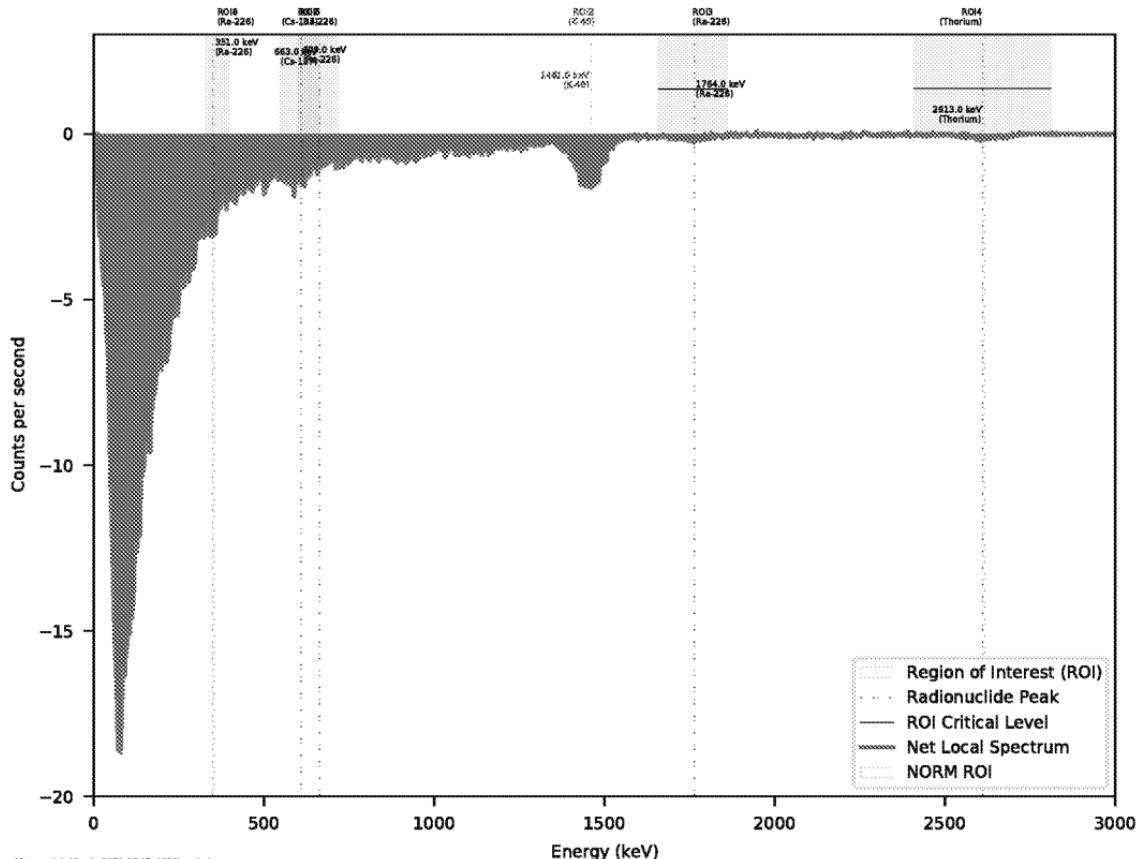


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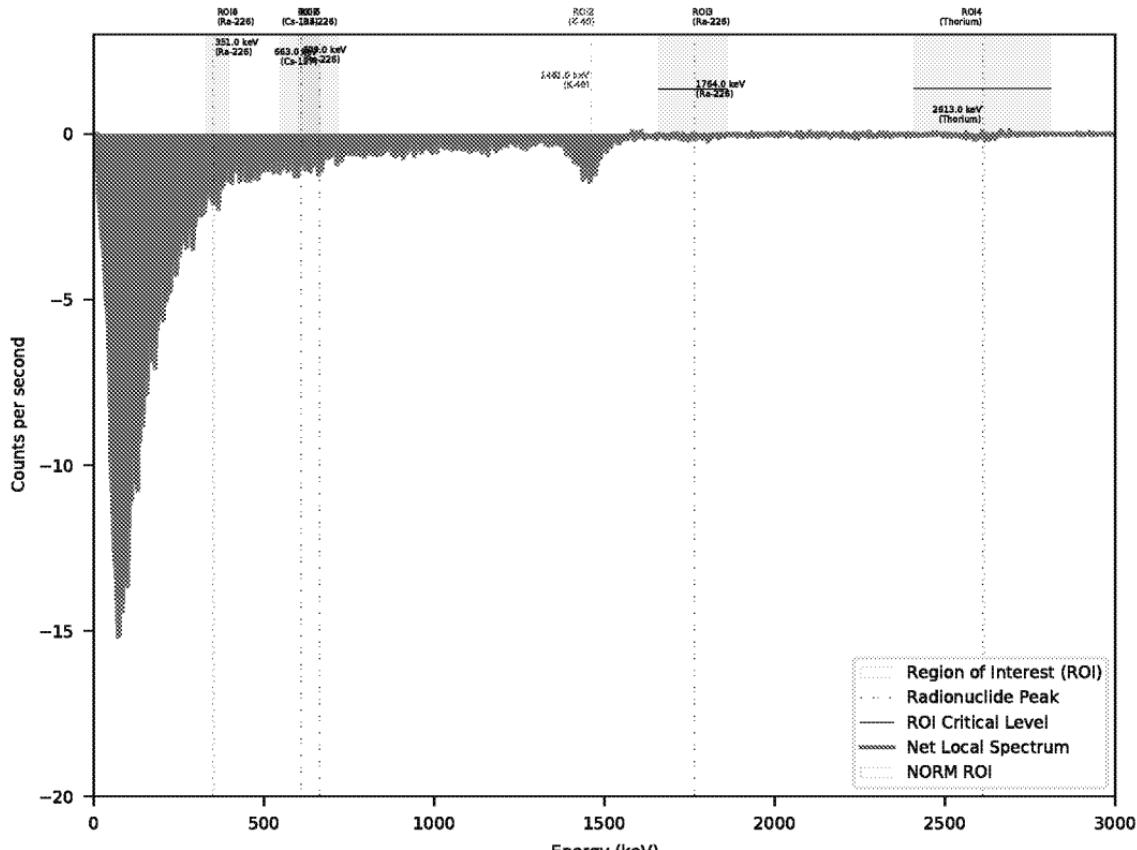
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Net Gamma Spectrum, Static Location: 13



ED_006360A_00000151-00026

Net Gamma Spectrum, Static Location: 14

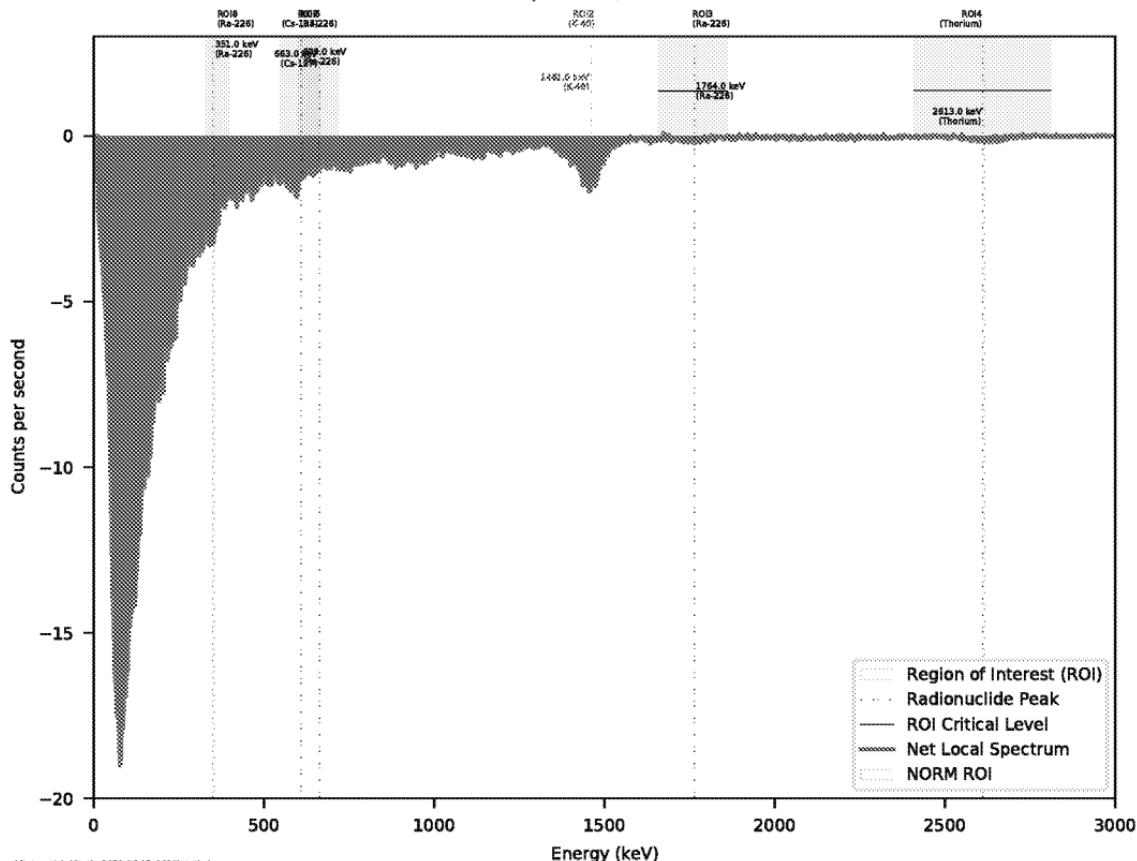


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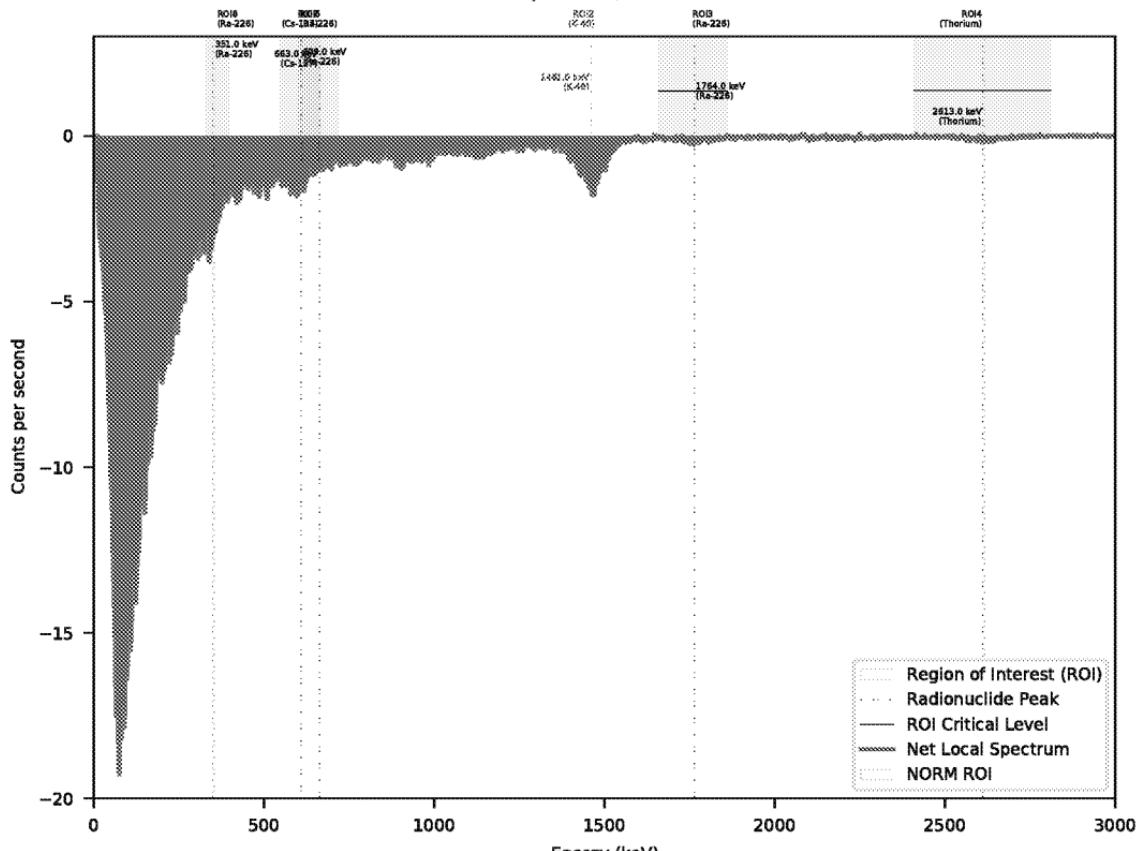


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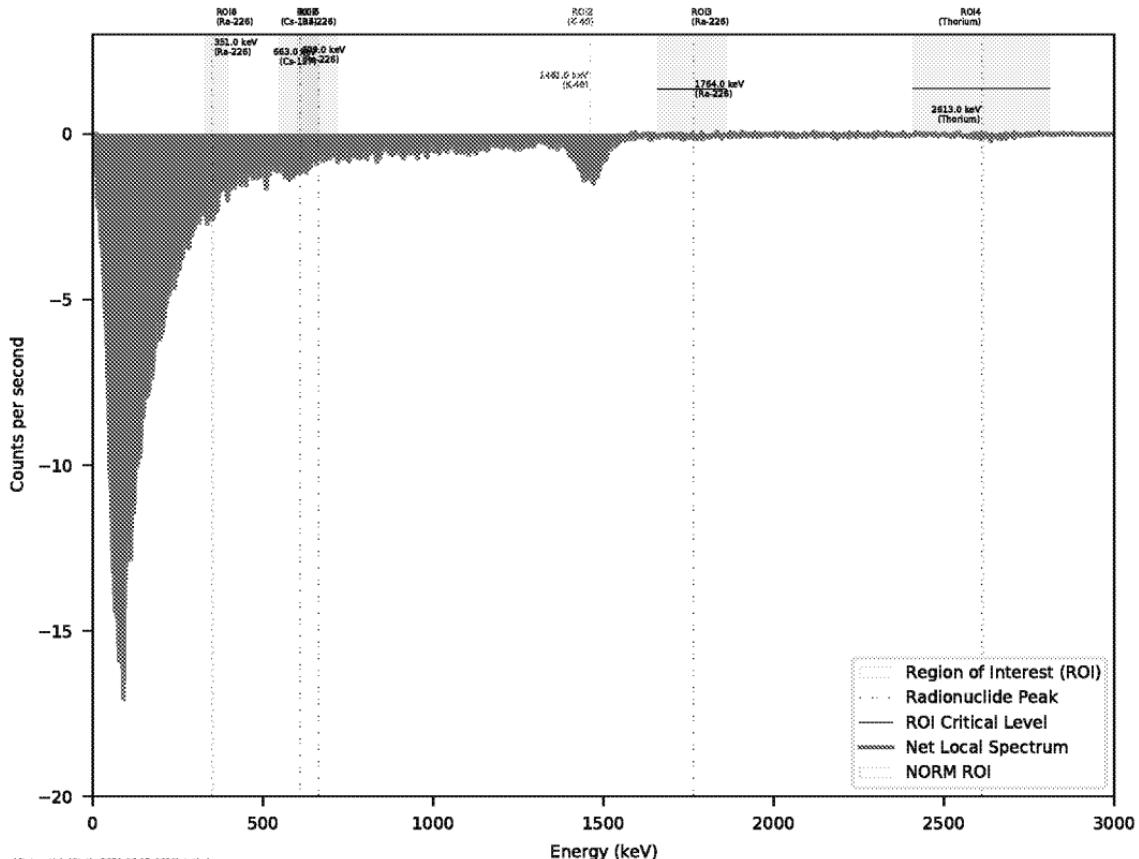


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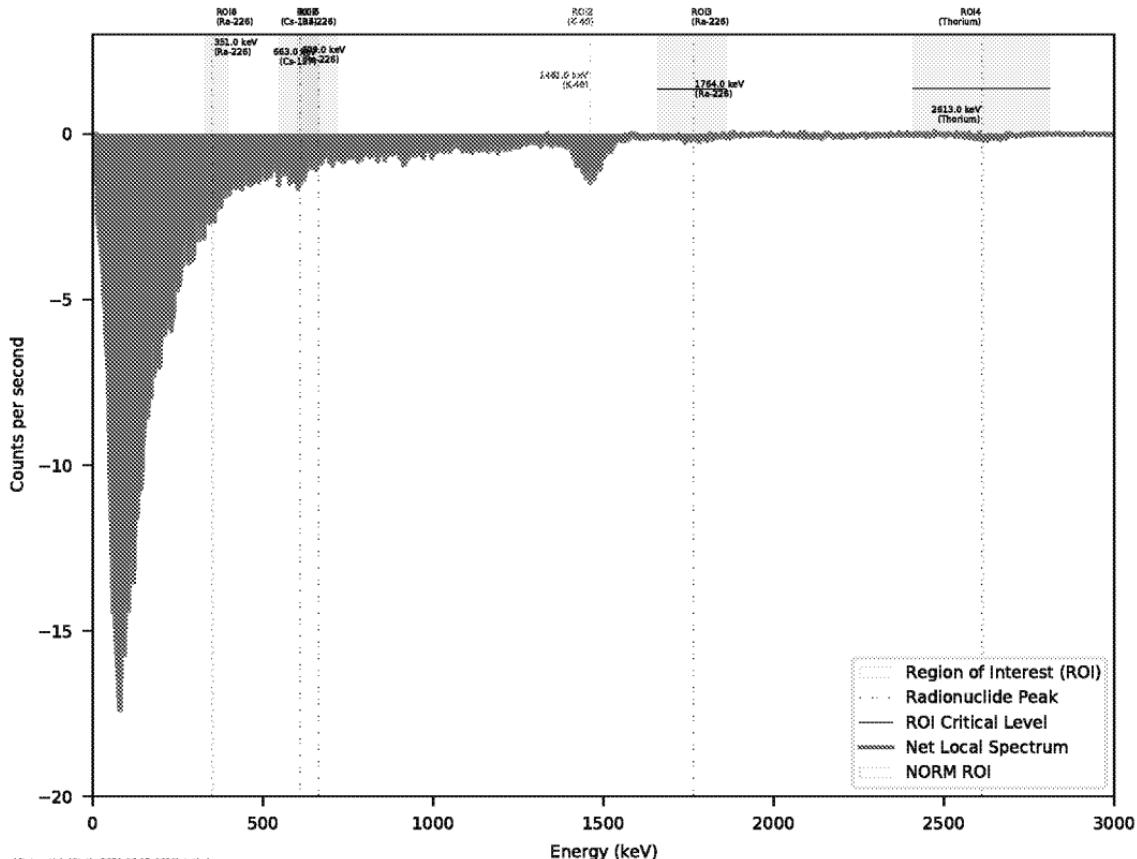


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ED_006360A_00000151-00030

Net Gamma Spectrum, Static Location: 18

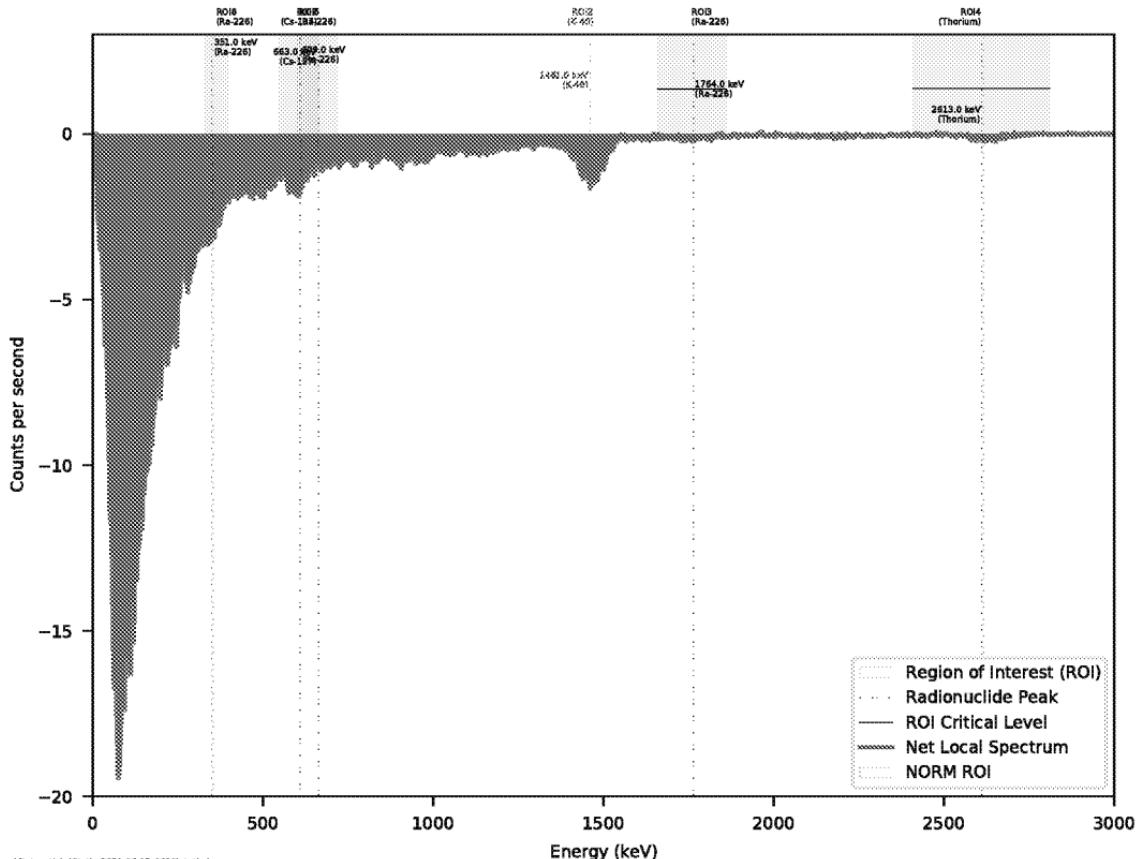


Local Dataset(s): lStatic_2021-06-15_1019/static/
Background Dataset(s): RSII_SoilRBA_Static.csv

Local Coordinates (Longitude, Latitude): -122.3648650064517, 37.72440928225805

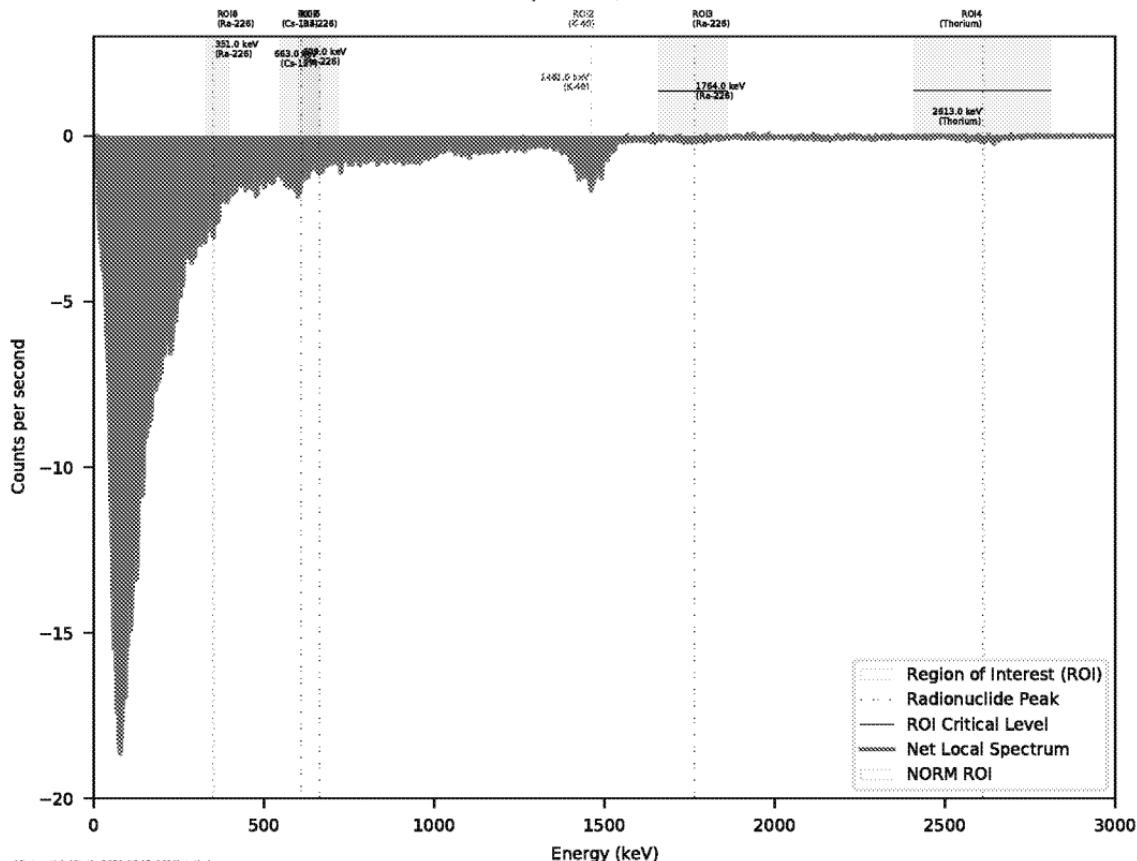
ED_006360A_00000151-00031

Net Gamma Spectrum, Static Location: 19



ED_006360A_00000151-00032

Net Gamma Spectrum, Static Location: 20

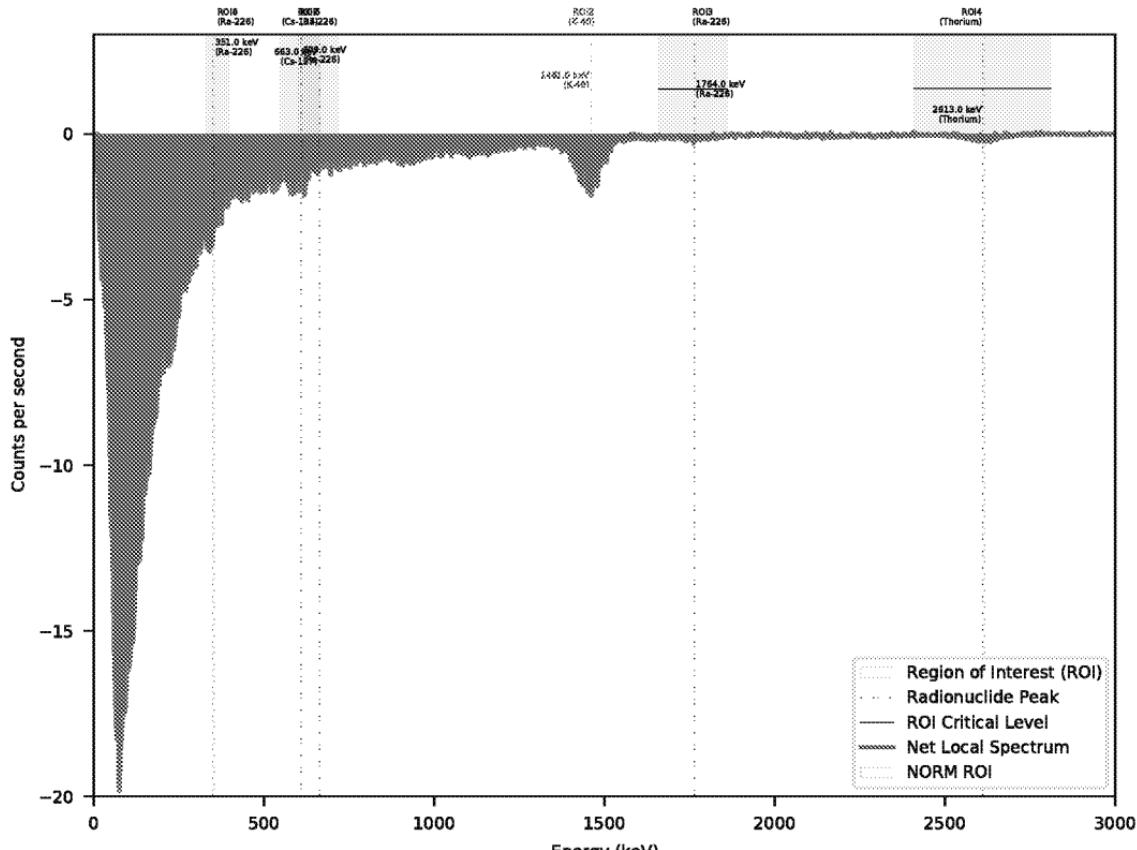


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Background Dataset(s): RSQ2_SoilRBA_Static.csv

Local Coordinates (Longitude, Latitude): -122.36448478225809, 37.724389124193536

ED_006360A_00000151-00033

Net Gamma Spectrum, Static Location: 21

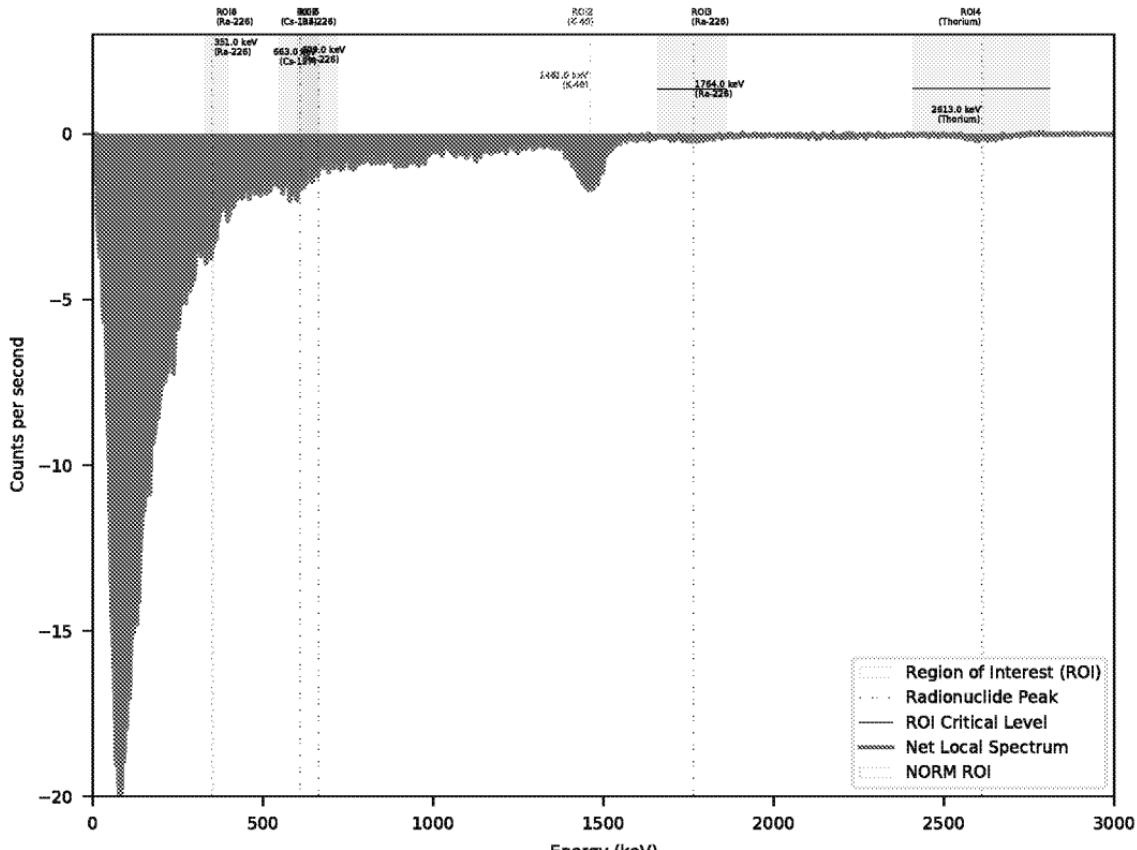


Local Dataset(s): lstatic_2021-06-15_1019/static/
Background Dataset(s): RSII_SoilRBA_Static.csv

Local Coordinates (Longitude, Latitude): -122.36446785409838, 37.724393386055725

ED_006360A_00000151-00034

Net Gamma Spectrum, Static Location: 22

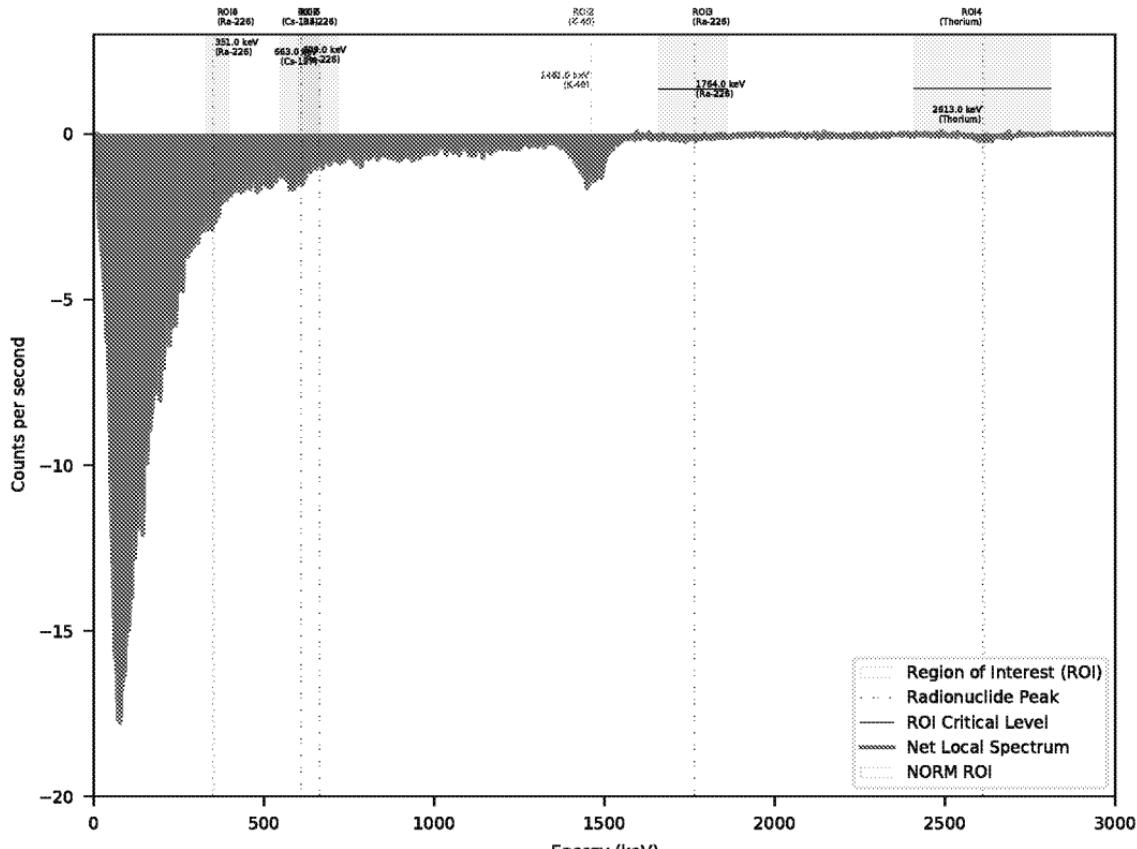


Local Dataset(s): lStatic_2021-06-15_1019/static/
Background Dataset(s): RSII_SoilNBA_Static.csv

Local Coordinates (Longitude, Latitude): -122.3648136727273, 37.724369798446485

ED_006360A_00000151-00035

Net Gamma Spectrum, Static Location: 23

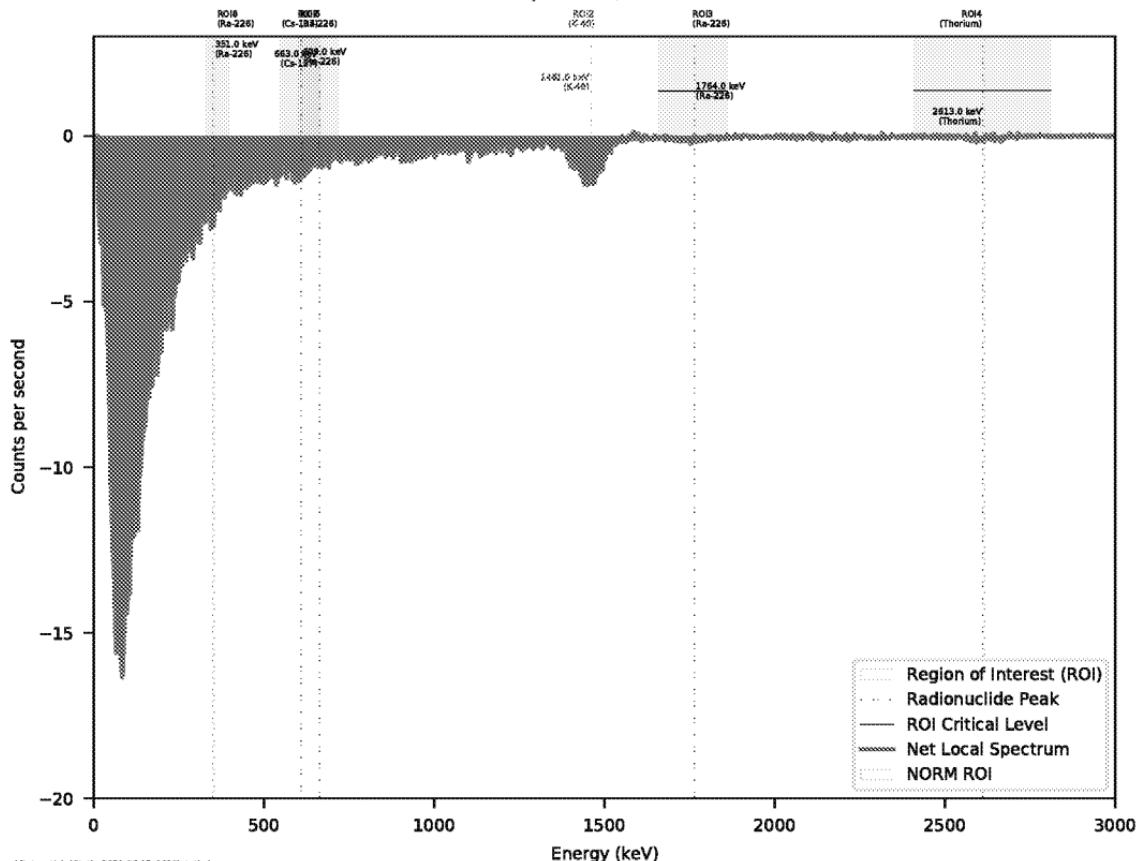


Local Dataset(s): lstatic_2021-06-15_1019/static/
Background Dataset(s): RSII_SoilRBA_Static.csv

Local Coordinates (Longitude, Latitude): -122.36488264354839, 37.7234935645161

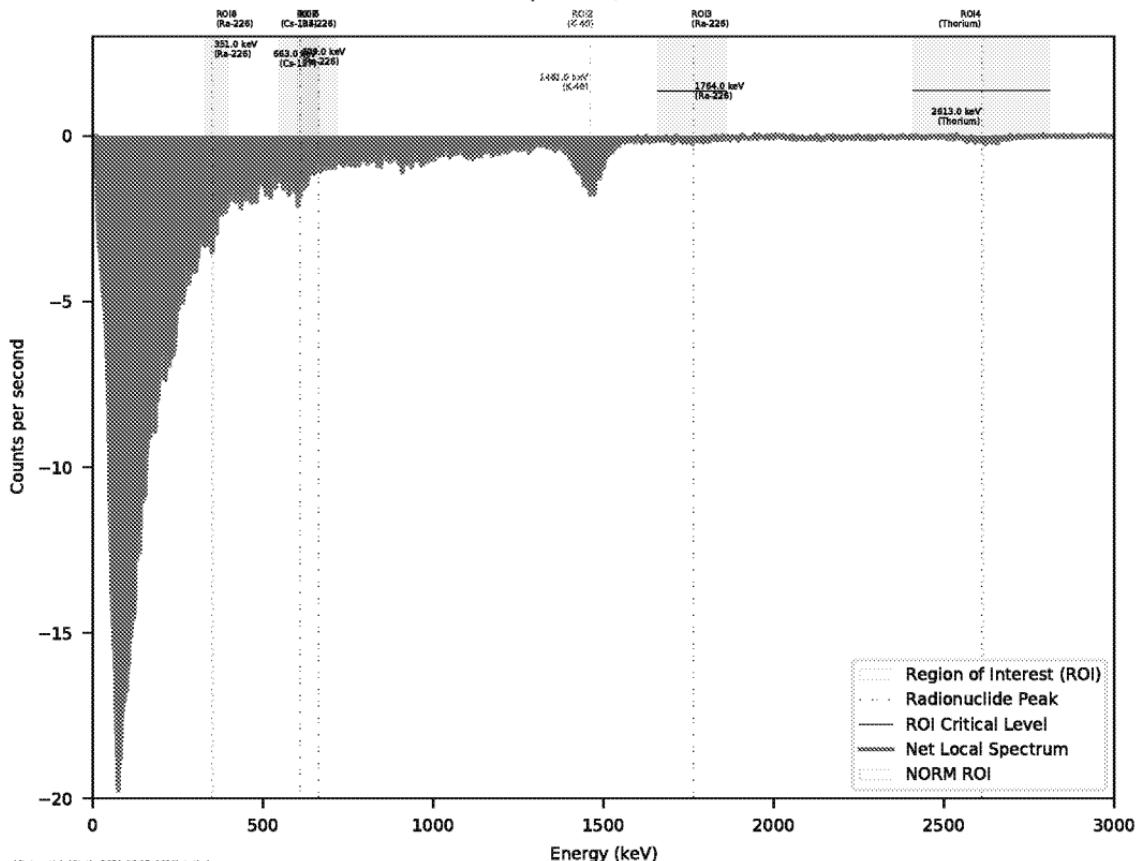
ED_006360A_00000151-00036

Net Gamma Spectrum, Static Location: 24



ED_006360A_00000151-00037

Net Gamma Spectrum, Static Location: 25

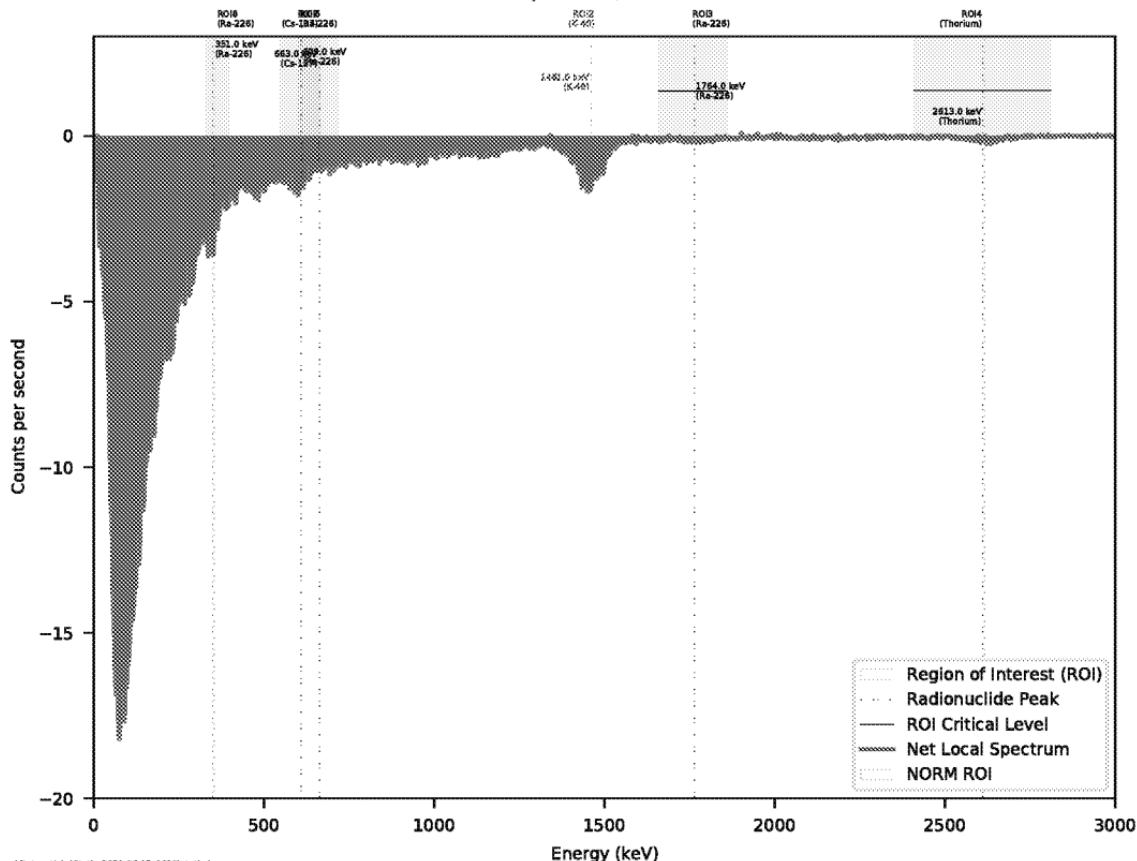


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Background Dataset(s): RSII_SoilRBA_Static.csv

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ED_006360A_00000151-00038

Net Gamma Spectrum, Static Location: 26

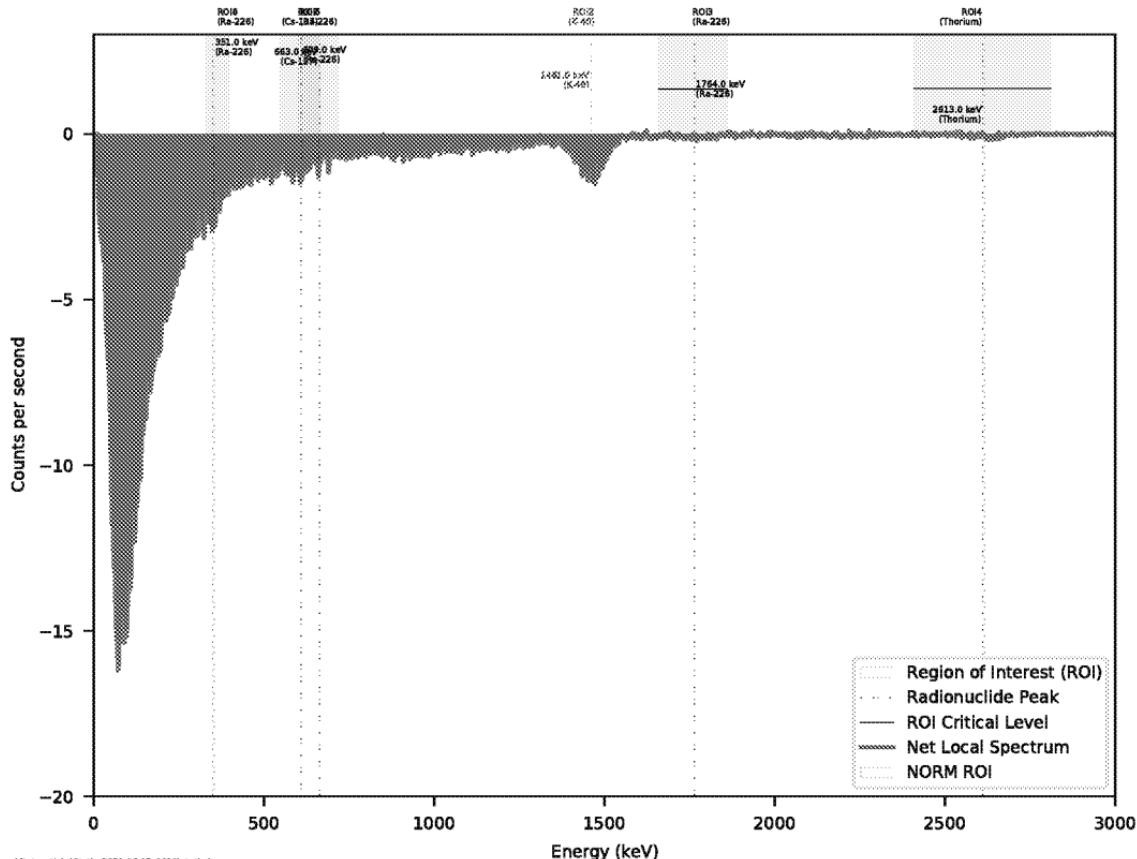


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Background Dataset(s): RSII_SoilRBA_Static.csv

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ED_006360A_00000151-00039

Net Gamma Spectrum, Static Location: 27

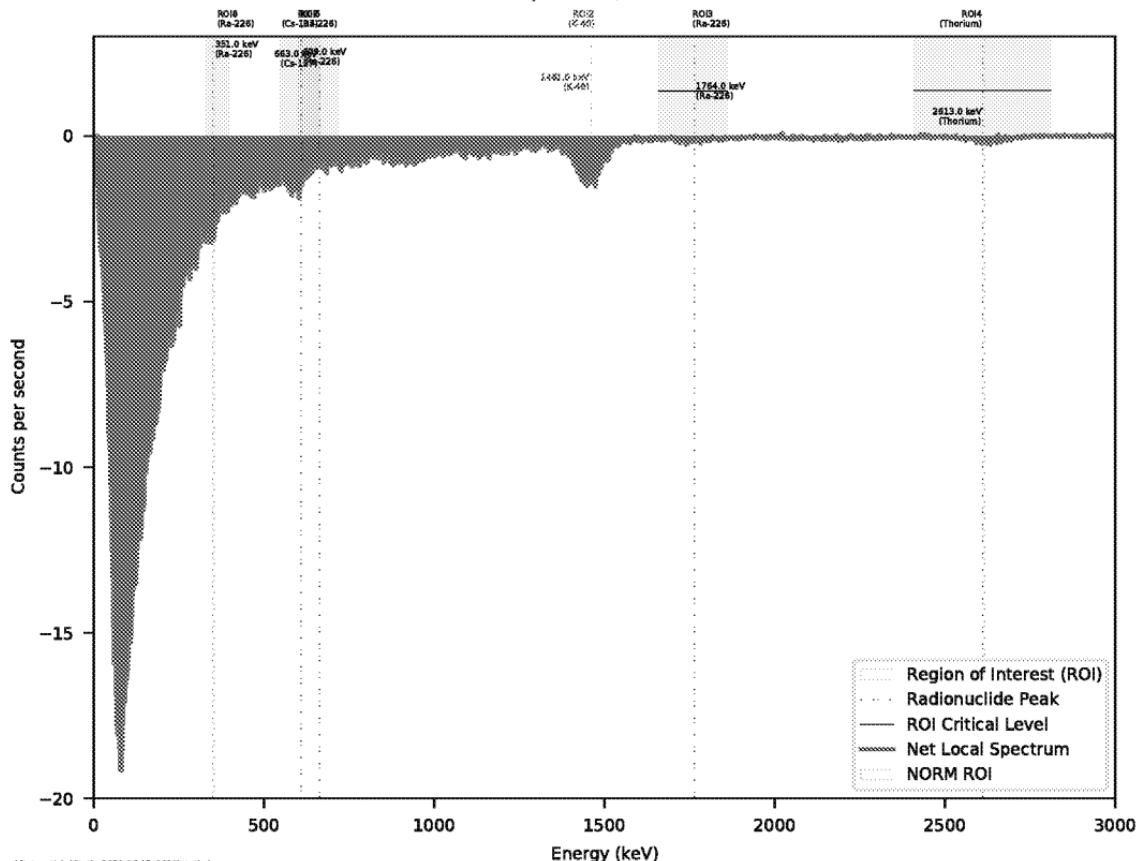


Local Dataset(s): lstatic_2021-06-15_1019/static/
Background Dataset(s): RSII_SoilRBA_Static.csv

Local Coordinates (Longitude, Latitude): -122.36478323076922, 37.72435837536462

ED_006360A_00000151-00040

Net Gamma Spectrum, Static Location: 28

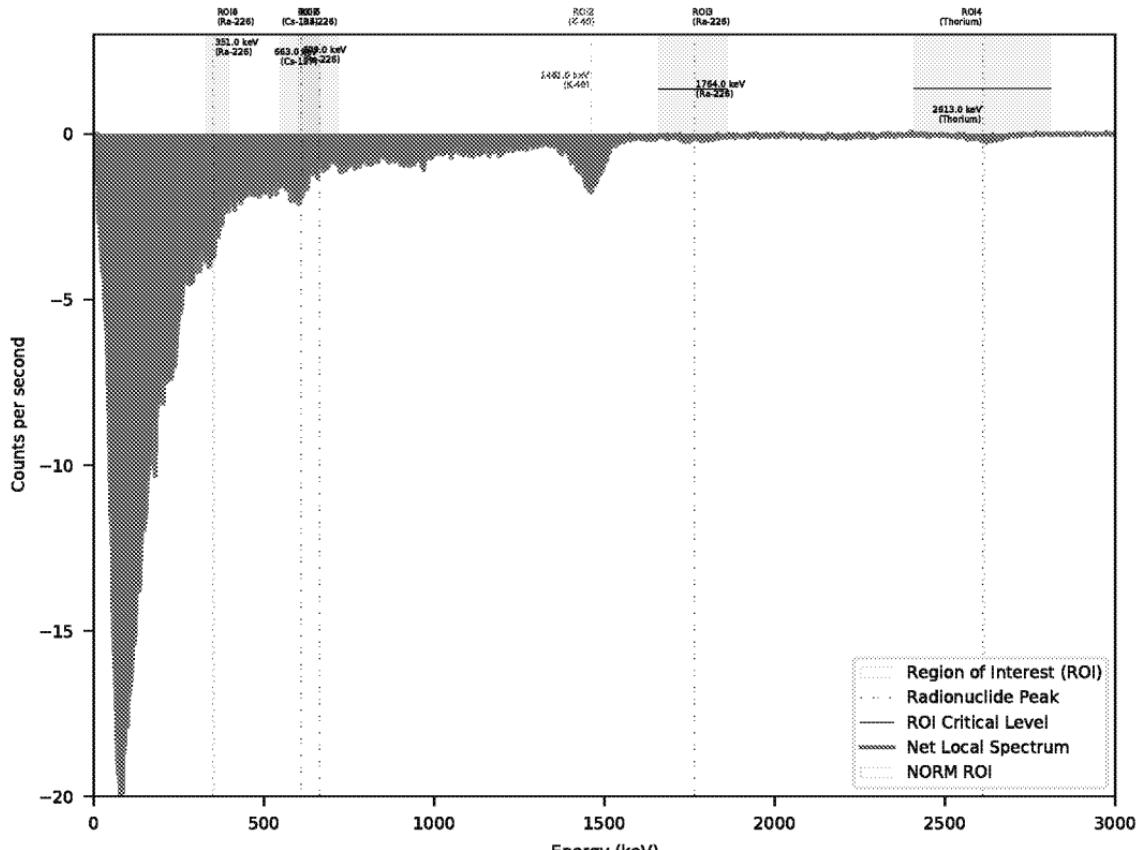


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Background Dataset(s): RSII_SoilRBA_Static.csv

Local Coordinates (Longitude, Latitude): -122.36488899264705, 37.72442674705862

ED_006360A_00000151-00041

Net Gamma Spectrum, Static Location: 29

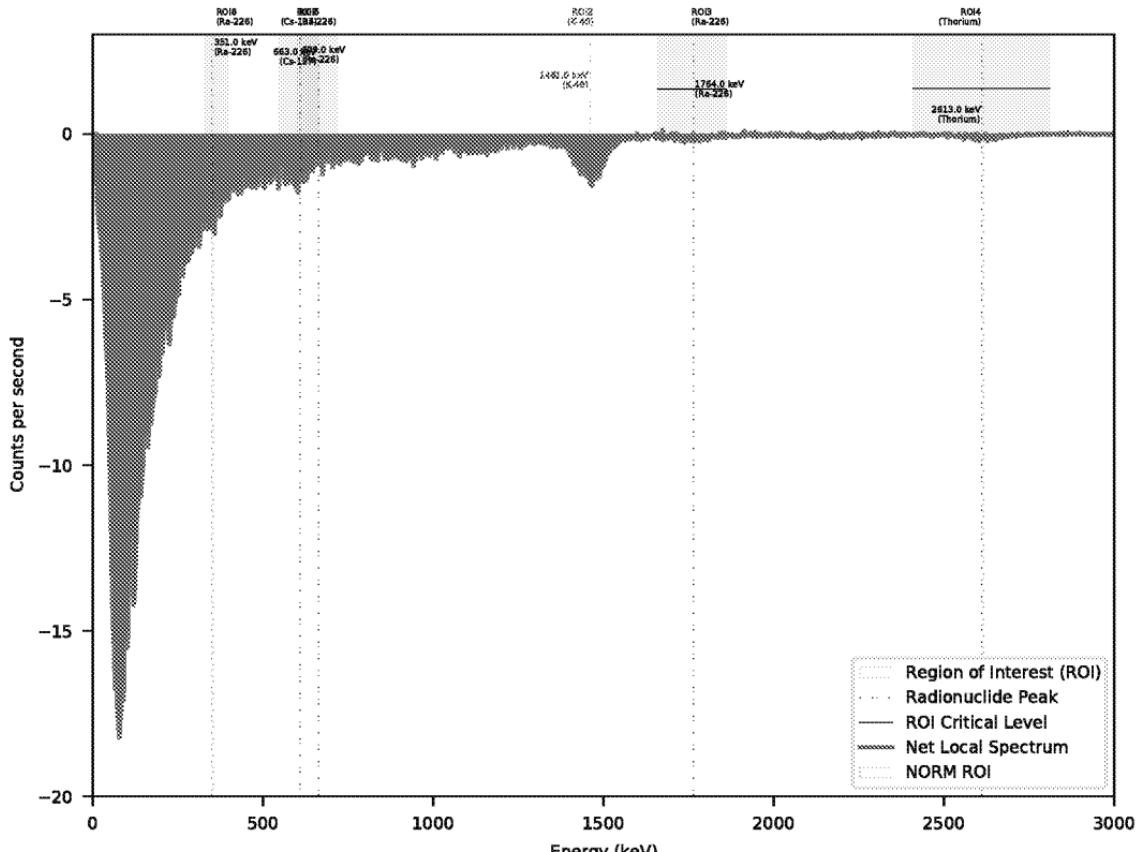


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Background Dataset(s): RSII_SoilRBA_Static.csv

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ED_006360A_00000151-00042

Net Gamma Spectrum, Static Location: 30

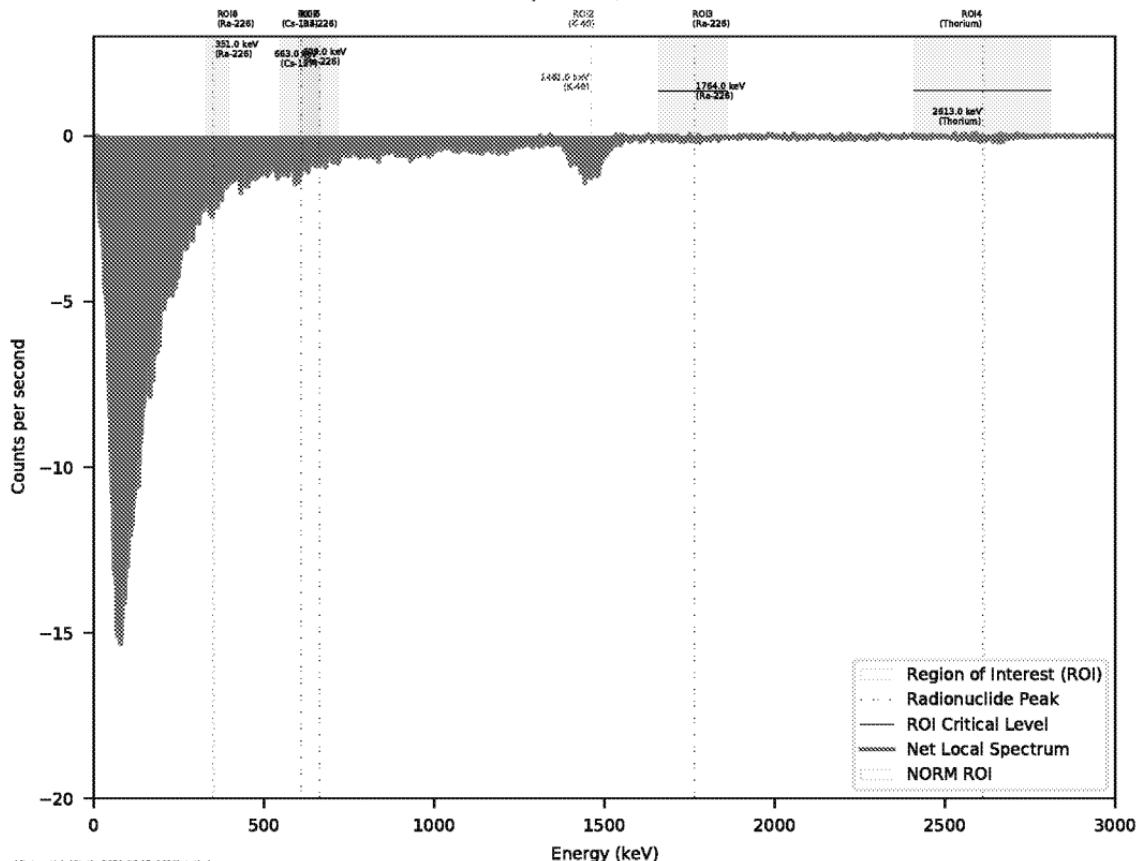


Local Dataset(s): lstatic_2021-06-15_1019/static/
Background Dataset(s): RSII_SoilRBA_Static.csv

Local Coordinates (Longitude, Latitude): -122.3649056140625, 37.7243497421875

ED_006360A_00000151-00043

Net Gamma Spectrum, Static Location: 31

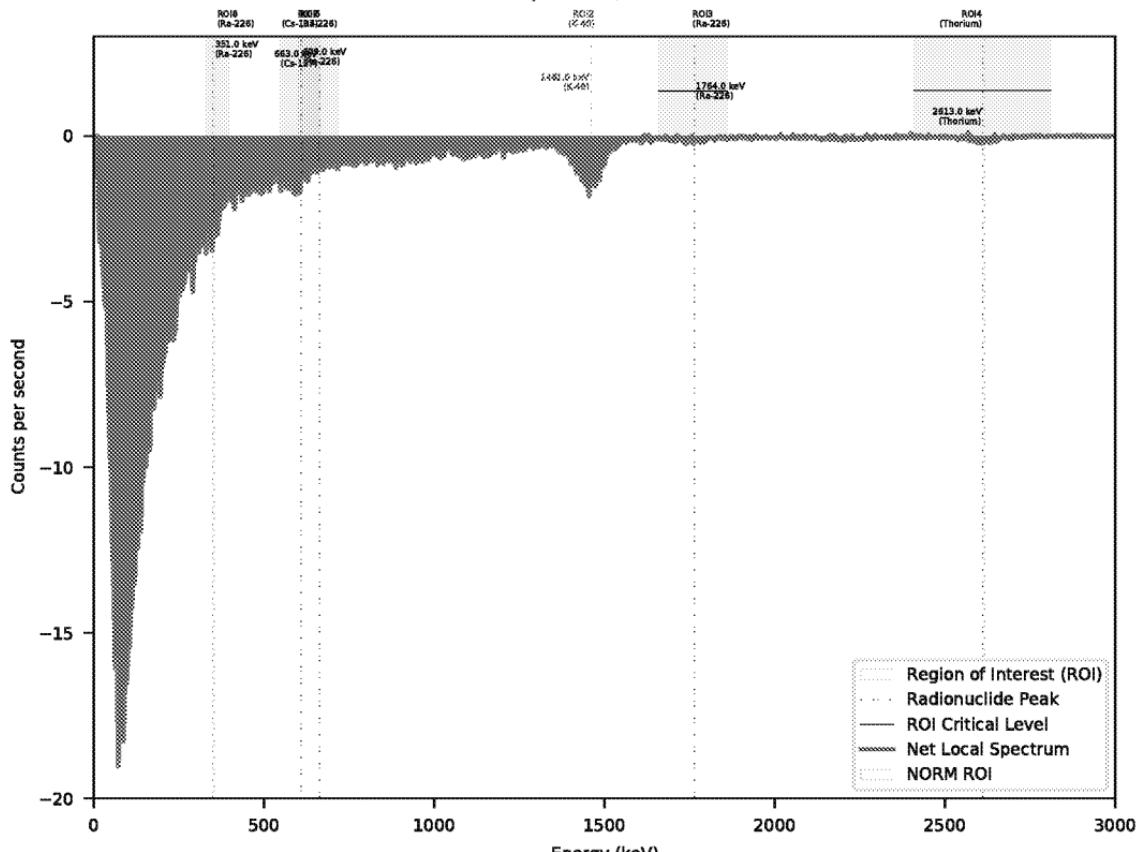


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Background Dataset(s): RSII_SoilRBA_Static.csv

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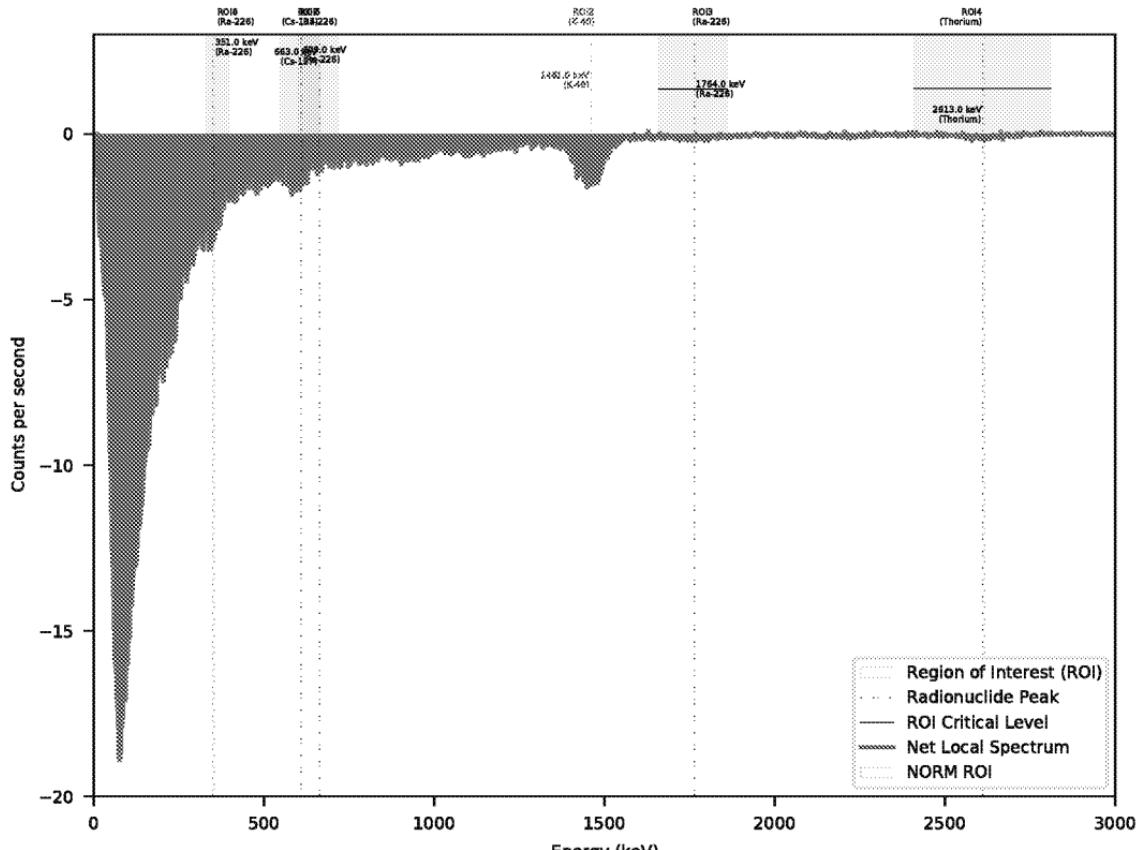
ED_006360A_00000151-00044

Net Gamma Spectrum, Static Location: 32



ED_006360A_00000151-00045

Net Gamma Spectrum, Static Location: 33

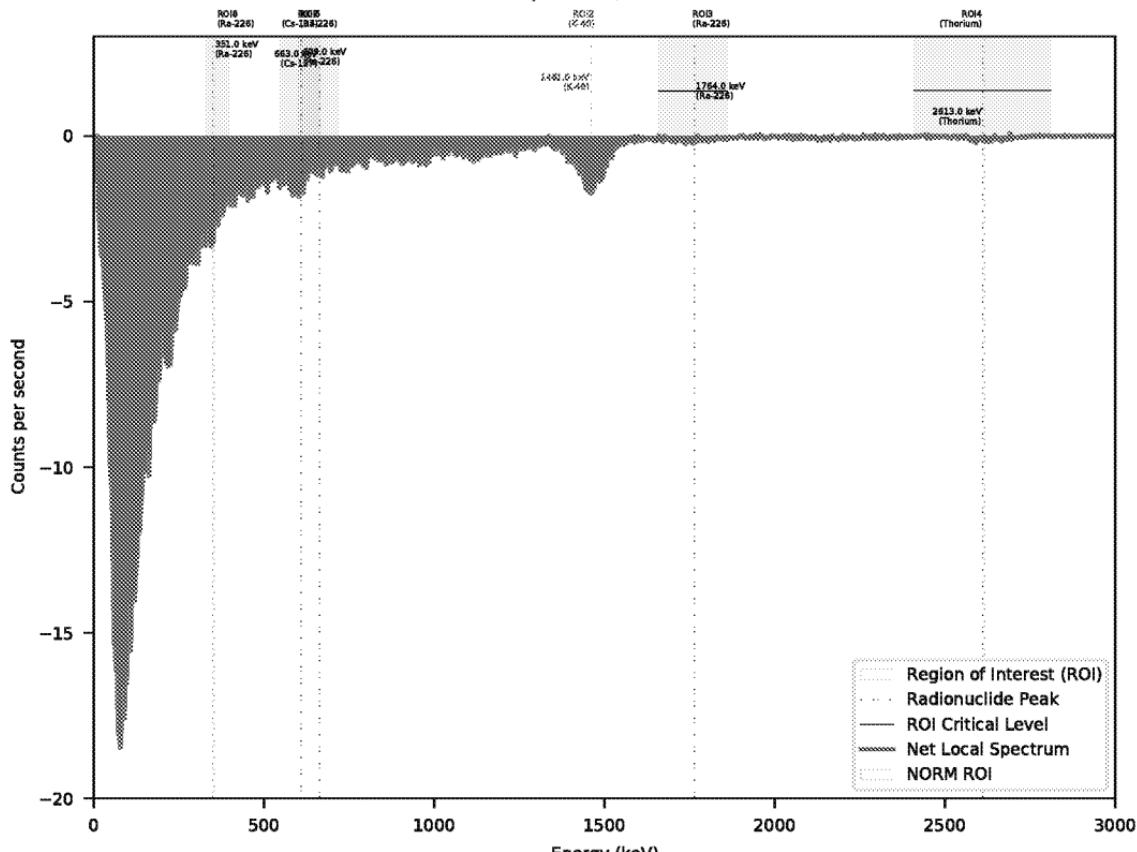


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Background Dataset(s): RSII_SoilRBA_Static.csv

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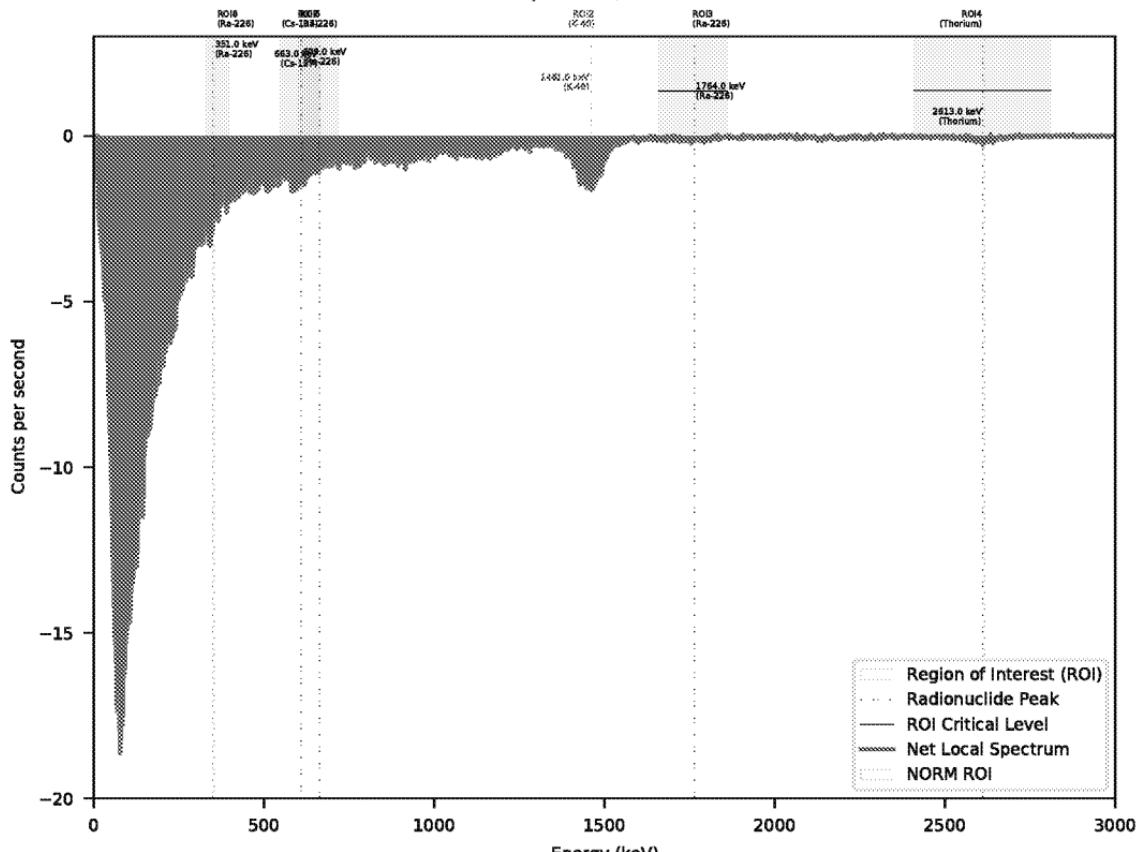
ED_006360A_00000151-00046

Net Gamma Spectrum, Static Location: 34



ED_006360A_00000151-00047

Net Gamma Spectrum, Static Location: 35

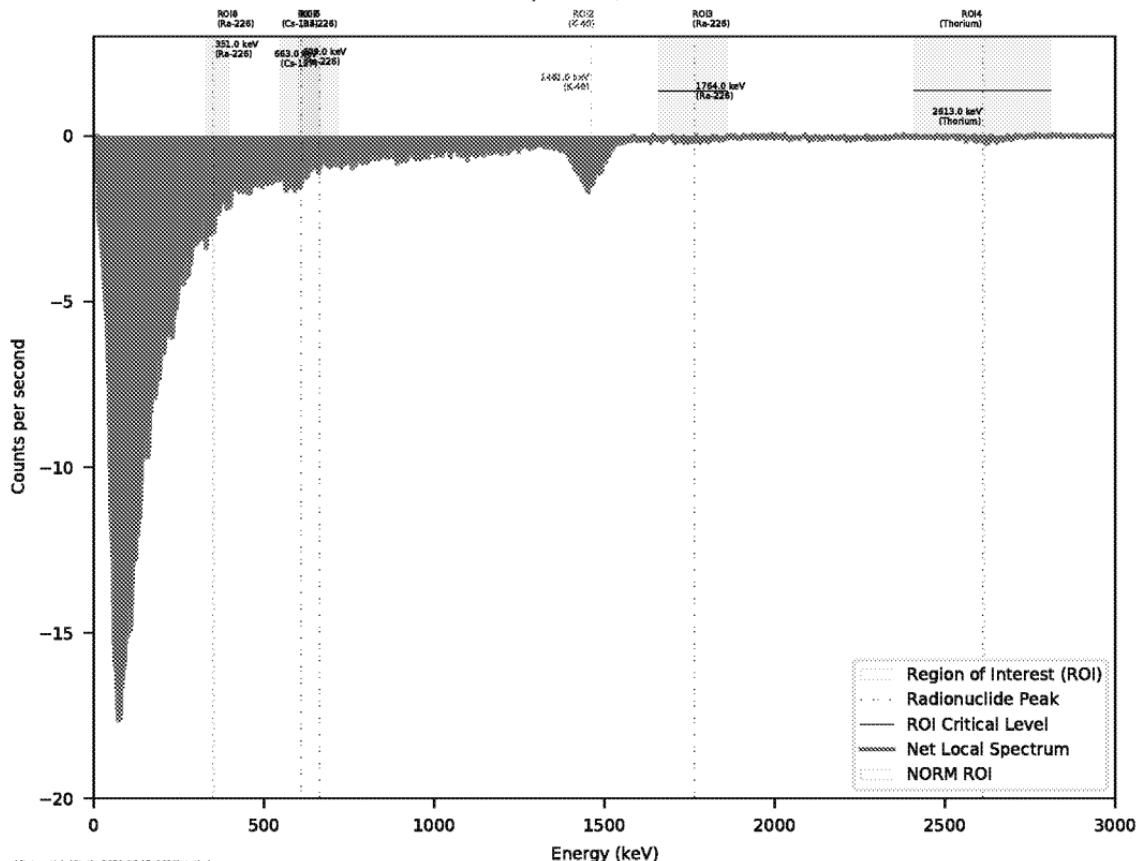


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Background Dataset(s): RSQ2_SoilRBA_Static.csv

Local Coordinates (Longitude, Latitude): -122.36488743125, 37.724284417187495

ED_006360A_00000151-00048

Net Gamma Spectrum, Static Location: 36

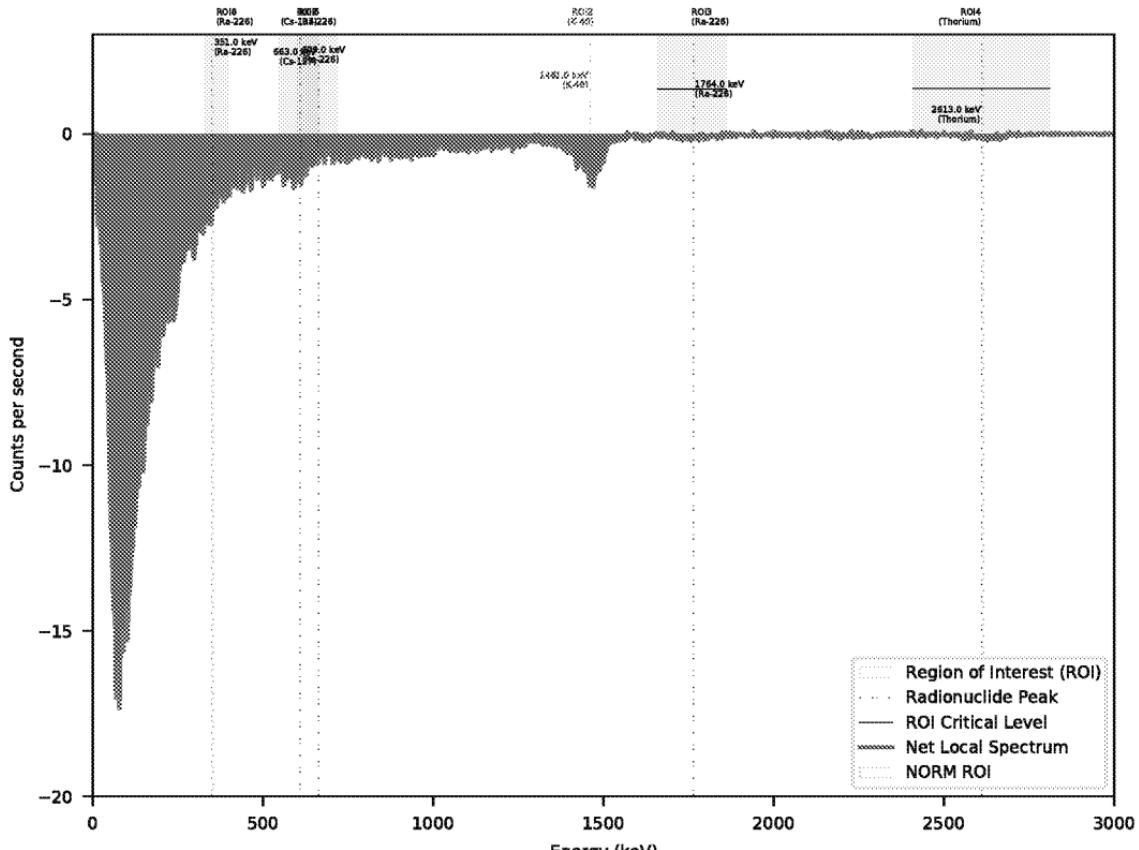


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Background Dataset(s): RSII_SoilRBA_Static.csv

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ED_006360A_00000151-00049

Net Gamma Spectrum, Static Location: 37

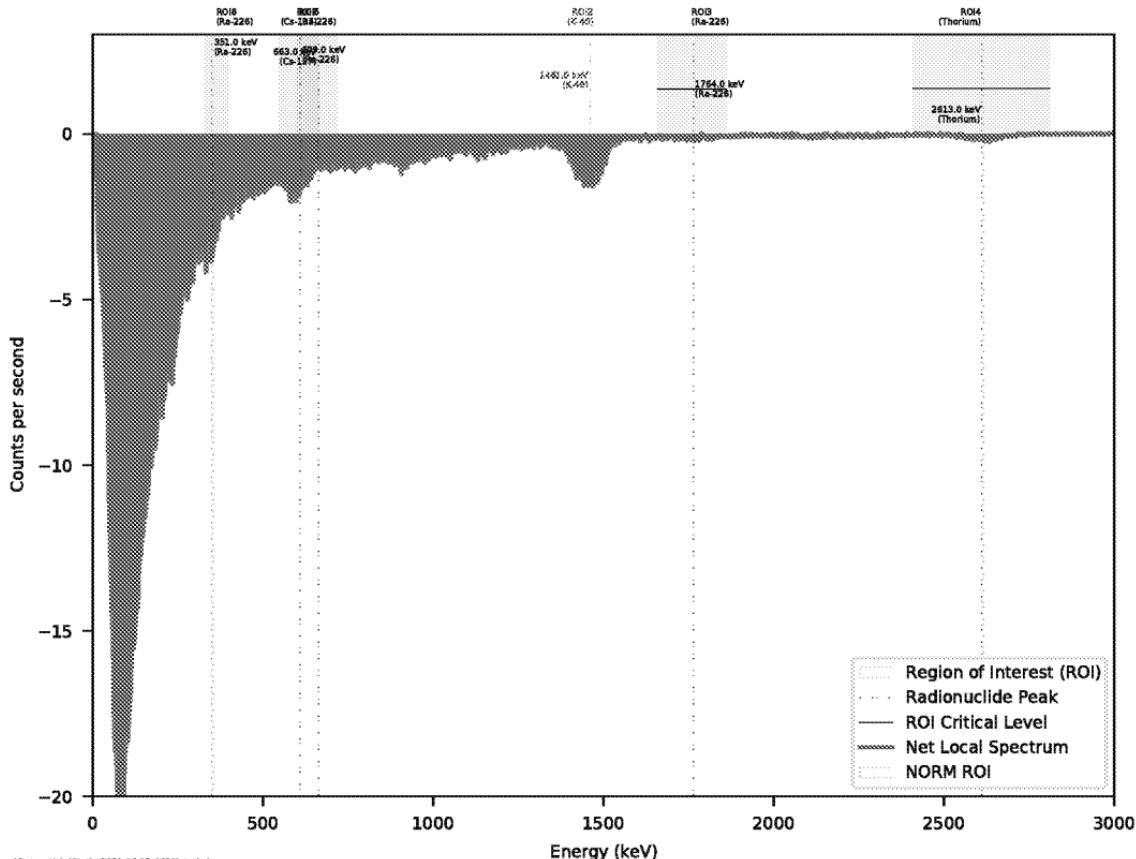


Local Dataset(s): lStatic_2021-06-15_1019\static
Background Dataset(s): RSII_SoilRBA_Static.csv

Local Coordinates (Longitude, Latitude): -122.36491517301584, 37.72434977777777

ED_006360A_00000151-00050

Net Gamma Spectrum, Static Location: 38

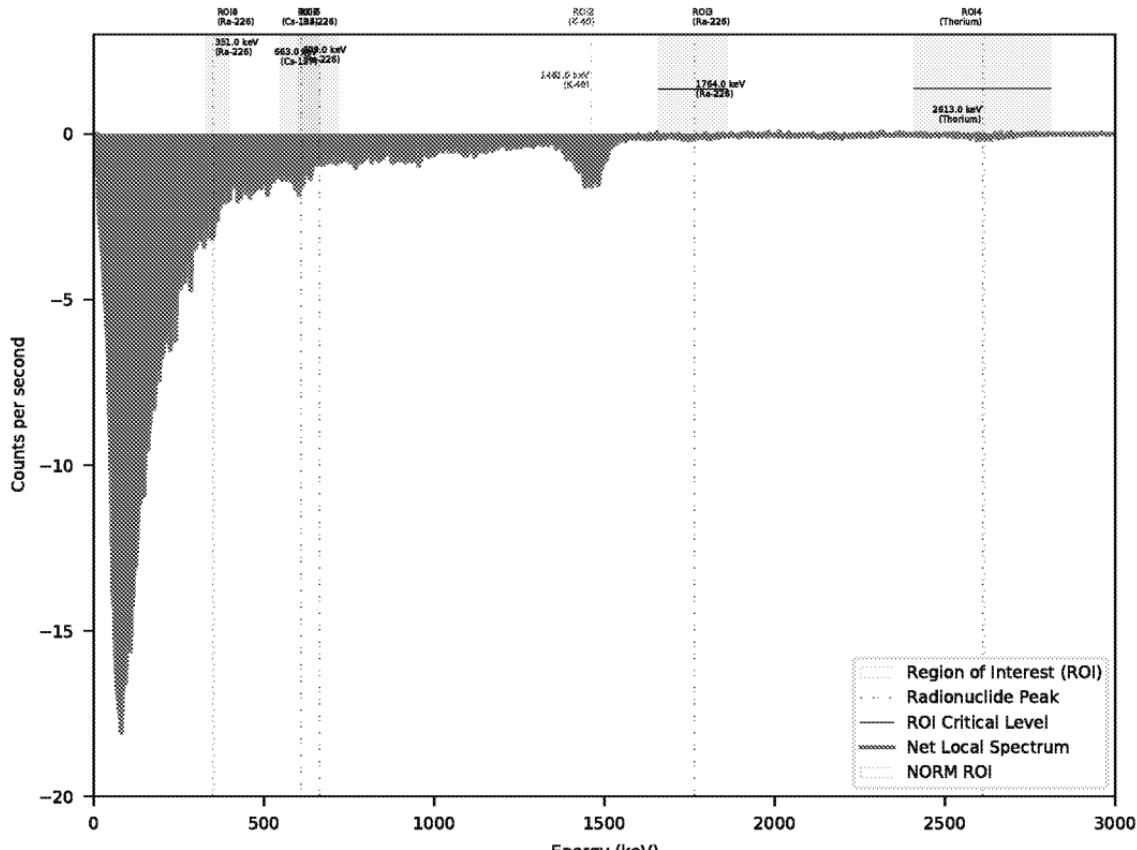


Local Dataset(s): lStatic_2021-06-15_1019\static
Background Dataset(s): RSII_SoilRBA_Static.csv

Local Coordinates (Longitude, Latitude): -122.36442154000003, 37.724362252857155

ED_006360A_00000151-00051

Net Gamma Spectrum, Static Location: 39

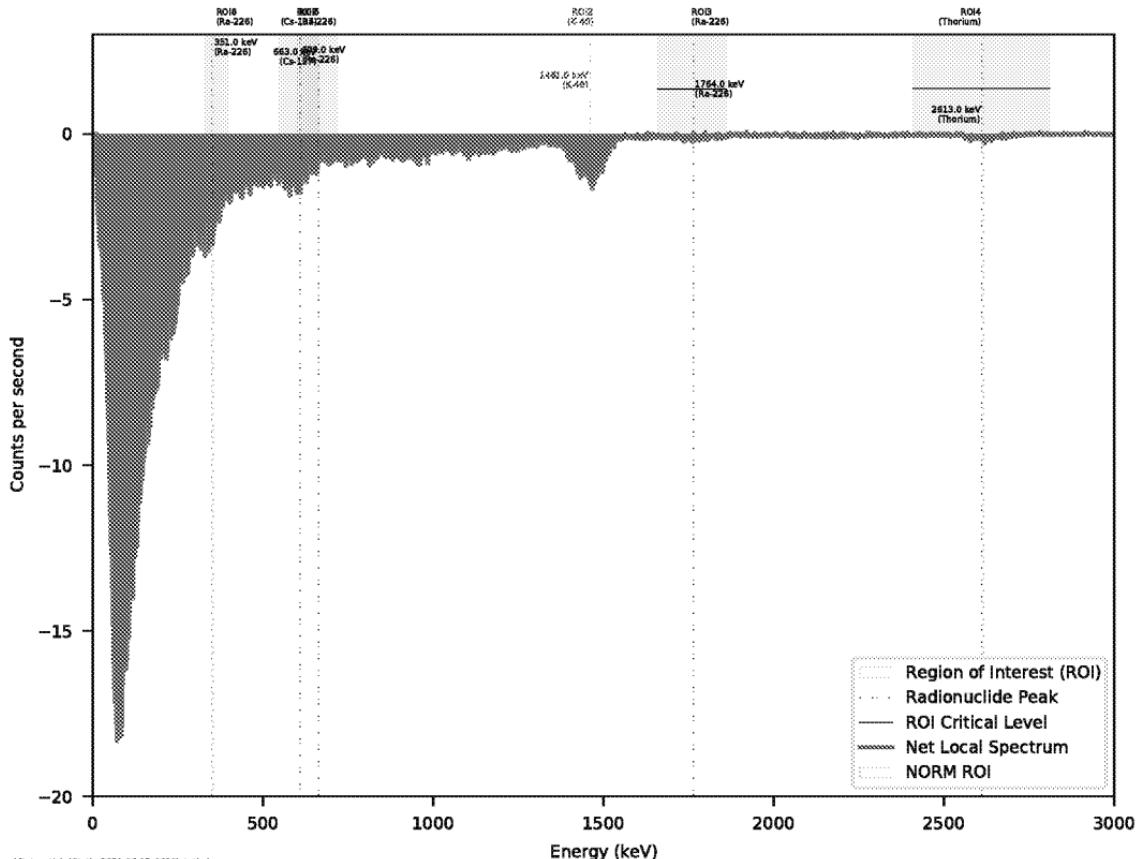


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Background Dataset(s): RSII_SoilRBA_Static.csv

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ED_006360A_00000151-00052

Net Gamma Spectrum, Static Location: 40

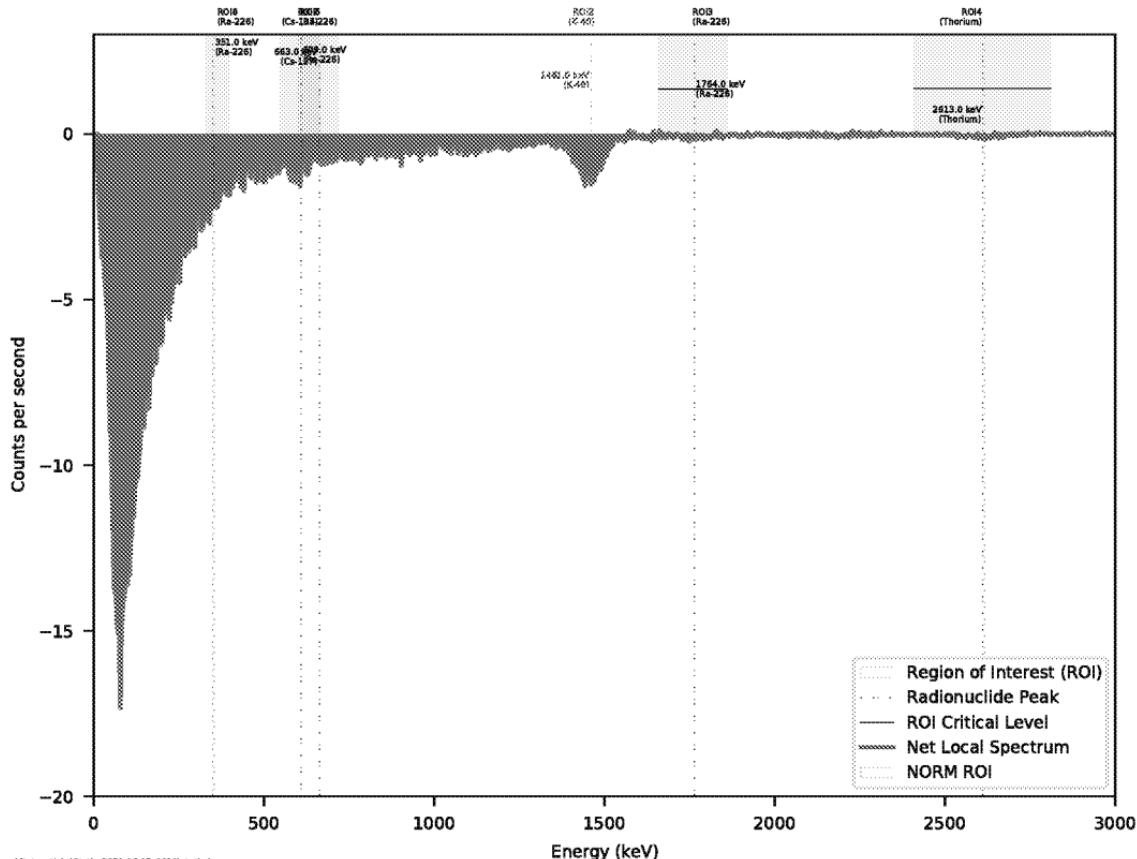


Local Dataset(s): lstatic_2021-06-15_1019/static/
Background Dataset(s): RSII_SoilRBA_Static.csv

Local Coordinates (Longitude, Latitude): -122.36494700158728, 37.724347861904775

ED_006360A_00000151-00053

Net Gamma Spectrum, Static Location: 41

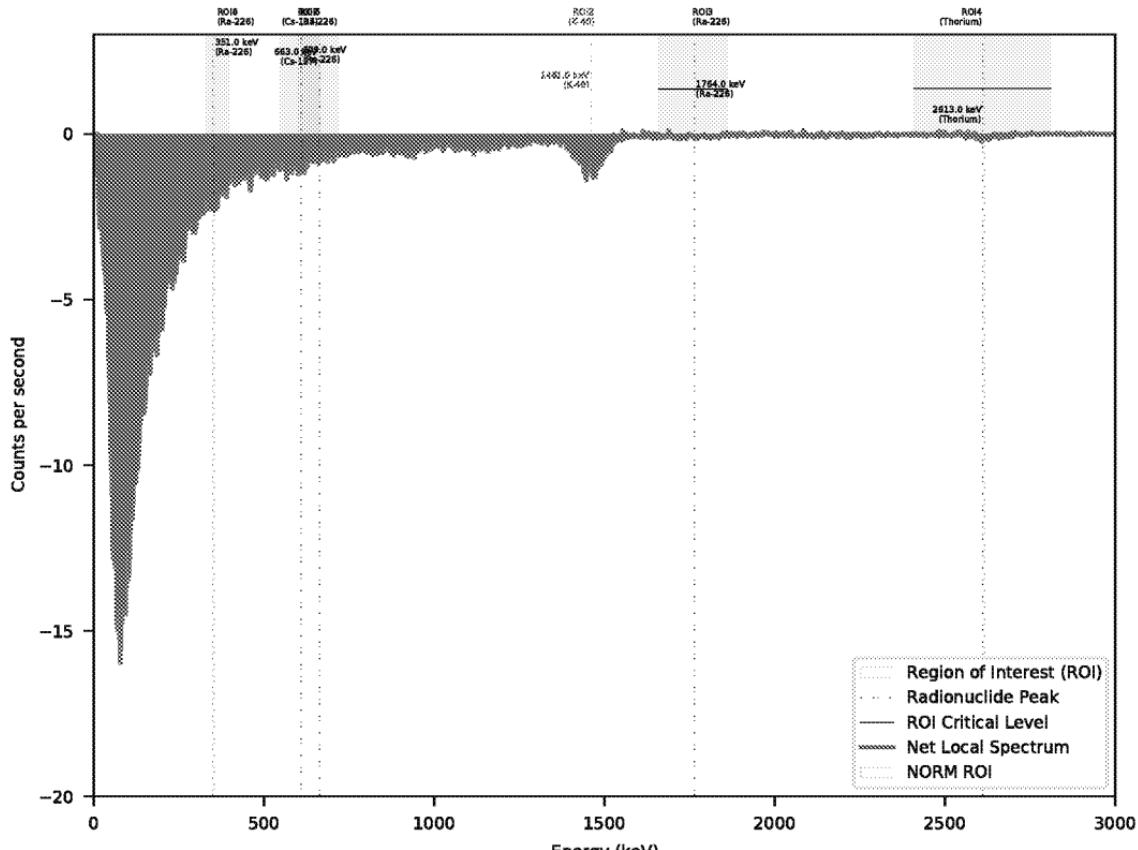


Local Dataset(s): lstatic_2021-06-15_1019/static/
Background Dataset(s): RSII_SoilRBA_Static.csv

Local Coordinates (Longitude, Latitude): -122.3649854615385, 37.724298024615384

ED_006360A_00000151-00054

Net Gamma Spectrum, Static Location: 42



ED_006360A_00000151-00055

Local Coordinates (Longitude, Latitude): -122.36475737285717, 37.72432005426571



Environment Testing
America

ANALYTICAL REPORT

Eurofins TestAmerica, St. Louis
13715 Rider Trail North
Earth City, MO 63045
Tel: (314)298-8566

Laboratory Job ID: 160-42413-1
Laboratory Sample Delivery Group: GJ46599751
Client Project/Site: HPNS-Parcel G 501197

For:
Aptim Federal Services LLC
4005 Port Chicago Hwy, Suite 200
Concord, California 94520

Attn: Rose Condit

Rhonda Ridenhower

Authorized for release by:
7/31/2021 11:45:10 AM

Rhonda Ridenhower, Client Service Manager
(314)298-8566
Rhonda.Ridenhower@Eurofinset.com

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The
Expert

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This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

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Case Narrative

Client: Aptim Federal Services LLC
Project/Site: HPNS-Parcel G 501197

Job ID: 160-42413-1
SDG: GJ46599751

Job ID: 160-42413-1

Laboratory: Eurofins TestAmerica, St. Louis

Narrative

CASE NARRATIVE

Client: Aptim Federal Services LLC

Project: HPNS-Parcel G 501197

Report Number: 160-42413-1

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In some cases, due to interference or analytes present at high concentrations, samples were diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

Eurofins TestAmerica, St. Louis attests to the validity of the laboratory data generated by Eurofins TestAmerica facilities reported herein. All analyses performed by Eurofins TestAmerica facilities were done using established laboratory SOPs that incorporate QA/QC procedures described in the application methods. Eurofins TestAmerica's operations groups have reviewed the data for compliance with the laboratory QA/QC plan, and data have been found to be compliant with laboratory protocols unless otherwise noted below.

The test results in this report meet all NELAP requirements for parameters for which accreditation is required or available. Any exceptions to NELAP requirements are noted in this report. Pursuant to NELAP, this report may not be reproduced, except in full, without the written approval of the laboratory.

Calculations are performed before rounding to avoid round-off errors in calculated results.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the individual sections below.

All solid sample results for Chemistry analyses are reported on an ""as received"" basis unless otherwise indicated by the presence of a % solids value in the method header. All soil/sediment sample results for radiochemistry analyses are based upon sample as dried and disaggregated with the exception of tritium, carbon-14, and iodine-129 by gamma spectroscopy unless requested as wet weight by the client."

Any minimum detectable concentration (MDC), critical value (DLC), or Safe Drinking Water Act detection limit (SDWA DL) is sample-specific unless otherwise stated elsewhere in this narrative.

Reference the chain of custody and condition upon receipt report for any variations on receipt conditions and temperature of samples on receipt.

Manual Integrations were performed only when necessary and are in compliance with the laboratory's standard operating procedure. Detailed information can be found in the raw data section of the level IV report.

Radiochemistry sample results are reported with the count date/time applied as the Activity Reference Date. The matrix for the Method Blank and LCS is as close to the following samples as can be reasonably achieved. Detailed information can be found in the most current revision of the associated SOP.

This laboratory report is confidential and is intended for the sole use of Eurofins TestAmerica and its client.

RECEIPT

The samples were received on 06/14/2021; the samples arrived in good condition, properly preserved. The temperature of the coolers at receipt was 27.8 C.

Case Narrative

Client: Aptim Federal Services LLC
Project/Site: HPNS-Parcel G 501197

Job ID: 160-42413-1
SDG: GJ46599751

Job ID: 160-42413-1 (Continued)

Laboratory: Eurofins TestAmerica, St. Louis (Continued)

STRONTIUM-90 (GFPC)

Samples HPPG-SFU-TU-115A-001 (160-42413-3), HPPG-SFU-TU-115A-011 (160-42413-13) and HPPG-SFU-TU-115A-021 (160-42413-23) were analyzed for Strontium-90 (GFPC) in accordance with EPA 905. The samples were dried on 06/15/2021, prepared on 07/20/2021 and analyzed on 07/29/2021.

The method blank (MB) z-score associated is within limits and is stored in the level IV raw data. (MB 160-519394/23-A)

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

ISOTOPIC PLUTONIUM (ALPHA SPECTROMETRY)

Samples HPPG-SFU-TU-115A-001 (160-42413-3), HPPG-SFU-TU-115A-011 (160-42413-13) and HPPG-SFU-TU-115A-021 (160-42413-23) were analyzed for Isotopic Plutonium (Alpha Spectrometry) in accordance with A-01-R. The samples were dried on 06/15/2021, prepared on 06/24/2021 and analyzed on 07/11/2021.

The method blank (MB) z-score is within limits and is stored in the level IV raw data. (MB 160-515911/1-A)

The following sample exhibited a negative result greater in magnitude than the 3 sigma TPU. This occurrence was evaluated and determined to be random in nature. Sporadic occurrences such as this are statistically expected. No further action is required. HPPG-SFU-TU-115A-001 (160-42413-3)

The detector (AV107) the sample was counted on failed the pulser resolution check the day after (closing bracket) the sample count. However, the sample tracer resolution was well within QC limits the day of the count. The laboratory does not believe this excursion adversely affects the data. (160-42315-A-3-E DU)

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

ISOTOPIC THORIUM (ALPHA SPECTROMETRY)

Samples HPPG-SFU-TU-115A-001 (160-42413-3), HPPG-SFU-TU-115A-011 (160-42413-13) and HPPG-SFU-TU-115A-021 (160-42413-23) were analyzed for Isotopic Thorium (Alpha Spectrometry) in accordance with DOE A01R_Th. The samples were dried on 06/15/2021, prepared on 06/24/2021 and analyzed on 07/08/2021.

The z-score was >3 for Thorium 232 in the method blank due to the activity being >MDC. However the detection goal was met and the activity was below the RL for the affected isotope indicating no adverse effect to the data.
(MB 160-515918/1-A)

A blank population correction was applied to account for contributions to the analyte count rate from sources other than the sample itself. Interferences may include, but are not limited to, impurities in reagents, tracers, or glassware, or effects due to the measurement process HPPG-SFU-TU-115A-001 (160-42413-3), HPPG-SFU-TU-115A-011 (160-42413-13), HPPG-SFU-TU-115A-021 (160-42413-23), (LCS 160-515918/2-A), (MB 160-515918/1-A), (160-42315-A-3-F) and (160-42315-A-3-G DU)

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

RADIUM-226 BY GAMMA SPEC (21 DAY INGROWTH)

Samples HPPG-F-075 (160-42413-1), HPPG-F-076 (160-42413-2), HPPG-SFU-TU-115A-001 (160-42413-3), HPPG-SFU-TU-115A-002 (160-42413-4), HPPG-SFU-TU-115A-003 (160-42413-5), HPPG-SFU-TU-115A-004 (160-42413-6), HPPG-SFU-TU-115A-005 (160-42413-7), HPPG-SFU-TU-115A-006 (160-42413-8), HPPG-SFU-TU-115A-007 (160-42413-9), HPPG-SFU-TU-115A-008 (160-42413-10), HPPG-SFU-TU-115A-009 (160-42413-11), HPPG-SFU-TU-115A-010 (160-42413-12), HPPG-SFU-TU-115A-011 (160-42413-13), HPPG-SFU-TU-115A-012 (160-42413-14), HPPG-SFU-TU-115A-013 (160-42413-15), HPPG-SFU-TU-115A-014 (160-42413-16), HPPG-SFU-TU-115A-015 (160-42413-17), HPPG-SFU-TU-115A-016 (160-42413-18), HPPG-SFU-TU-115A-017 (160-42413-19), HPPG-SFU-TU-115A-018 (160-42413-20), HPPG-SFU-TU-115A-019 (160-42413-21), HPPG-SFU-TU-115A-020 (160-42413-22), HPPG-SFU-TU-115A-021 (160-42413-23), HPPG-SFU-TU-115A-022 (160-42413-24), HPPG-SFU-TU-115A-023 (160-42413-25), HPPG-SFU-TU-115A-024 (160-42413-26) and HPPG-SFU-TU-115A-025 (160-42413-27) were analyzed for Radium-226 by gamma spec (21 day ingrowth) in accordance with EPA GA_01_R. The samples were dried on 06/15/2021, prepared on 06/17/2021 and analyzed on 07/09/2021 and 07/10/2021.

Case Narrative

Client: Aptim Federal Services LLC
Project/Site: HPNS-Parcel G 501197

Job ID: 160-42413-1
SDG: GJ46599751

Job ID: 160-42413-1 (Continued)

Laboratory: Eurofins TestAmerica, St. Louis (Continued)

Many isotopes requested for analysis do not have any gamma emissions, or the gamma emissions they do have are very poor. Often, such analytes are reported by gamma spectrometry assuming secular equilibrium with a longer-lived parent. The client should ensure that such inference is acceptable for their sample based upon process knowledge. The following assumptions were made for this report:

Inferred from Reported to Analyte

Th-234	Pa-234
Th-234	U-238
Pb-210	Po-210
Pb-210	Bi-210
Cs-137	Ba-137m
Pb-212	Po-216
Xe-131m	Xe-131
Sb-125	Te-125m
Ag-108m	Ag-108
Rh-106	Ru-106
Pb-212	Th-228
Pb-212	Ra-224
U-235	Th-231
Ac-228	Th-232
Ac-228	Ra-228
Th-227	Ra-223
Th-227	Ac-227
Th-227	Bi-211
Th-227	Pb-211
Bi-214	Ra-226

Gamma prep batch 514709

The method blank (MB) z-score is within limits and is stored in the level IV raw data. (MB 160-514709/1-A)

Gamma prep batch 514714

The method blank (MB) z-score is within limits and is stored in the level IV raw data. (MB 160-514714/1-A)

The following sample exhibited a negative result greater in magnitude than the 3 sigma TPU for Th-234/U-238: HPPG-SFU-TU-115A-012 (160-42413-14). This occurrence was evaluated and determined to be random in nature. Sporadic occurrences such as this are statistically expected. No further action is required.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.



CHAIN OF CUSTODY

Ref. Document # 501197RSY-070

Page 1 of 4

APTIM Federal Services, LLC

4005 Port Chicago Hwy
Concord, CA 94520Project Manager: Lisa Bercik
Phone #: (619)213-3389Send Report to: Rose Condit
Phone/Fax Number: 415-987-0760
Address: 4005 Port Chicago Hwy

Sample Lead: Rizzo, Trevor

Sample Tech(s): Stacy Hatch

<p>Project Number: 501197</p> <p>Project Name: Hunters Point Naval Shipyard: Parcel G Remedial Action</p> <p>Project Location: San Francisco, CA</p> <p>Purchase Order #: 1159058</p> <p>Shipment/Pickup Date: 6/11/2021</p> <p>Waybill Number: 4957 0225 9309</p> <p>Lab Destination: Test America (St. Louis Lab) 13715 Rider Trail North Earth City, MO 63046</p>				<p>Analysis Requested</p> <p>Strontium-90 (EPA 905 MOD)</p> <p>Gammaray in Ground Gamma</p> <p>Isotope Pu(238, 239, 240)</p>				Dose Rate uR/Hr	Evidence Bag ID	Comment	
<p>Lab Contact Name/ph #</p> <p>Rhoeda Ridenbower (314)298-8566</p>				# of Containers	Preservatives (water)	Preservatives (soil)	Container Type				
Sample ID	Date	Time	Method	Matrix							
HPPG-F-075	6/11/2021	09:54	G	SO	1	16 oz. plastic jar	X				4
HPPG-F-076	6/11/2021	11:12	G	SO	1	16 oz. plastic jar	X				4
HPPG-SFU-TU11SA-001	6/11/2021	09:46	G	SO	1	16 oz. plastic jar	X	X	X	X	4
HPPG-SFU-TU11SA-002	6/11/2021	09:54	G	SO	1	16 oz. plastic jar	X				4
HPPG-SFU-TU11SA-003	6/11/2021	10:02	G	SO	1	16 oz. plastic jar	X				4
HPPG-SFU-TU11SA-004	6/11/2021	10:09	G	SO	1	16 oz. plastic jar	X				4
HPPG-SFU-TU11SA-005	6/11/2021	10:15	G	SO	1	16 oz. plastic jar	X				4
HPPG-SFU-TU11SA-006	6/11/2021	10:33	G	SO	1	16 oz. plastic jar	X				4

Special Instructions: 21 day ingrowth results only

Turnaround Time: 3-day 10-Day 28-day Other

Level of QC Required: I II III Project Specific

Method Codes C = Composite, G = Grab Matrix Codes: DW = Drinking Water, SO = Soil, GW = Ground Water, SL = Sludge, WW = Waste Water, CP = Chip Samples, A = Air, ABS = Asbestos, PO = Pipe Opening

Relinquished By:

Relinquisher Signature:

Relinquish Date Time:

Received By:

Received Signature:

Receive Date Time:

Rizzo, Trevor		06/11/2021 14:38	SHIPPEDTOLAB		
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*** Last 3 transfers shown above - Complete list of transfers on last page

FED EX

micha kouinhijt 6/14/2021 08:45



CHAIN OF CUSTODY

Ref. Document # 501197RSY-070

Page 2 of 4

APTIM Federal Services, LLC

4005 Port Chicago Hwy
Concord, CA 94520Project Manager: Lisa Bercik
Phone #: (619)213-3389Send Report to: Rose Condit
Phone/Fax Number: 415-987-9760
Address: 4005 Port Chicago Hwy
City: Concord, CA 94520

Sample Lead: Rizzo, Trevor

Sample Tech(s): Stacy Hatch

Project Number: 501197				Analysis Requested								Comment							
Hunters Point Naval Shipyard Parcel Project Name: G Remedial Action				Gamma Spec (EPA 901.1 M) - Full 21 day in growth gamma		Strontium-90 (EPA 905 MOD)		Iodine-131 Pu (238, 230, 232)		Dose Rate uR/Hr		Evidence Bag ID							
Project Location: San Francisco, CA																			
Purchase Order #: 1150058																			
Shipment/Pickup Date: 6/11/2021				Waybill Number:	4957 0725 9309														
Lab Destination: Test America (St. Louis Lab) 13715 Rider Trail North Earth City, MO 63046																			
Lab Contact Name/ph #				Rheda Ridenbower (314)298-8566															
Sample ID	Collection Information			Matrix	# of Container S	Preservatives (water)		Preservatives (soil)		Container Type									
	Date	Time	Method																
	HPPG-SFU-TU115A-007	6/11/2021	10:35	G	SO	1	16 oz. plastic jar	X				4	GJ46599751						
HPPG-SFU-TU115A-008	6/11/2021	10:40	G	SO	1	16 oz. plastic jar	X					4	GJ46599751						
HPPG-SFU-TU115A-009	6/11/2021	10:24	G	SO	1	16 oz. plastic jar	X					4	GJ46599751						
HPPG-SFU-TU115A-010	6/11/2021	10:44	G	SO	1	16 oz. plastic jar	X					4	GJ46599751						
HPPG-SFU-TU115A-011	6/11/2021	10:47	G	SO	1	16 oz. plastic jar	X		X	X	X	4	GJ46599751						
HPPG-SFU-TU115A-012	6/11/2021	10:52	G	SO	1	16 oz. plastic jar	X					4	GJ46599751						
HPPG-SFU-TU115A-013	6/11/2021	10:54	G	SO	1	16 oz. plastic jar	X					4	GJ46599751						
HPPG-SFU-TU115A-014	6/11/2021	10:56	G	SO	1	16 oz. plastic jar	X					4	GJ46599751						
HPPG-SFU-TU115A-015	6/11/2021	11:04	G	SO	1	16 oz. plastic jar	X					4	GJ46599751						
HPPG-SFU-TU115A-016	6/11/2021	11:12	G	SO	1	16 oz. plastic jar	X					4	GJ46599751						
HPPG-SFU-TU115A-017	6/11/2021	11:17	G	SO	1	16 oz. plastic jar	X					4	GJ46599751						
HPPG-SFU-TU115A-018	6/11/2021	11:24	G	SO	1	16 oz. plastic jar	X					4	GJ46599751						
HPPG-SFU-TU115A-019	6/11/2021	11:27	G	SO	1	16 oz. plastic jar	X					4	GJ46599751						
HPPG-SFU-TU115A-020	6/11/2021	12:46	G	SO	1	16 oz. plastic jar	X					4	GJ46599751						
HPPG-SFU-TU115A-021	6/11/2021	12:51	G	SO	1	16 oz. plastic jar	X		X	X	X	4	GJ46599751						
HPPG-SFU-TU115A-022	6/11/2021	12:55	G	SO	1	16 oz. plastic jar	X					4	GJ46599751						
HPPG-SFU-TU115A-023	6/11/2021	13:01	G	SO	1	16 oz. plastic jar	X					4	GJ46599751						



CHAIN OF CUSTODY

Ref. Document # 501197RSY-070

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APTIM Federal Services, LLC

4005 Port Chicago Hwy
Concord, CA 94520

Project Manager: Lisa Bercik
Phone #: (619)213-3389

Send Report to: Rose Condit
Phone/Fax Number: 415-987-0760
Address: 4005 Port Chicago Hwy
City: Concord, CA 94520

Sample Lead: Rizzo, Trevor

Sample Tech(s): Stacy Hatch

				Project Number: 501197		Analysis Requested				Evidence Bag ID	Comment		
				Hunters Point Naval Shipyard Parcel Project Name: G Remedial Action									
				Project Location: San Francisco, CA						Isotope Pu (239, 239Pu)	Dose Rate uR/Hr		
				Purchase Order #: 1159058									
				Shipment/Pickup Date: 6/11/2021									
				Waybill Number:	4957 0225 9309								
				Lab Destination: Test America (St. Louis Lab) 13715 Rider Trail North Earth City, MO 63046									
				Lab Contact Name/ph #: Rhoeda Ridenbower (314)298-8566									
				Matrix	# of Containers	Preservatives (water)		Preservatives (soil)		Isotope Th(228, 230, 232)	Dose Rate uR/Hr		
						Container Type							
HPPG-SFU-TU115A-024	6/11/2021	13:09	G	SO	1	16 oz. plastic jar	X			4	GJ46599751		
HPPG-SFU-TU115A-025	6/11/2021	13:12	G	SO	1	16 oz. plastic jar	X			4	GJ46599751		

All Transfers for COC 501197RSY-070

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Relinquished By:	Relinquisher Signature:	Relinquish Date Time:	Received By:	Received Signature:	Receive Date Time:
Rizzo, Trevor		06/11/2021 14:38	SHIPPEDTOLAB	FED EX	

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Micha Konurings 6/14/2021
08:45



Login Sample Receipt Checklist

Client: Aptim Federal Services LLC

Job Number: 160-42413-1

SDG Number: GJ46599751

Login Number: 42413

List Source: Eurofins TestAmerica, St. Louis

List Number: 1

Creator: Worthington, Sierra M

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	N/A	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Definitions/Glossary

Client: Aptim Federal Services LLC
Project/Site: HPNS-Parcel G 501197

Job ID: 160-42413-1
SDG: GJ46599751

Qualifiers

Rad Qualifier	Qualifier Description
U	Undetected at the Limit of Detection.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
%	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CFU	Colony Forming Unit
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)
TNTC	Too Numerous To Count

Method Summary

Client: Aptim Federal Services LLC
Project/Site: HPNS-Parcel G 501197

Job ID: 160-42413-1
SDG: GJ46599751

Method	Method Description	Protocol	Laboratory
905	Strontium-90 (GFPC)	EPA	TAL SL
A-01-R	Isotopic Plutonium and Neptunium (Alpha Spectrometry)	DOE	TAL SL
A-01-R	Isotopic Thorium (Alpha Spectrometry)	DOE	TAL SL
GA-01-R	Radium-226 & Other Gamma Emitters (GS)	DOE	TAL SL
DPS-7	Preparation, Digestion/Precipitate Separation (7-Day In-Growth)	None	TAL SL
Dry and Grind	Preparation, Dry and Grind	None	TAL SL
ExtChrom	Preparation, Extraction Chromatography Resin Actinide Separation	None	TAL SL
Fill_Geo-21	Fill Geometry, 21-Day In-Growth	None	TAL SL

Protocol References:

DOE = U.S. Department of Energy

EPA = US Environmental Protection Agency

None = None

Laboratory References:

TAL SL = Eurofins TestAmerica, St. Louis, 13715 Rider Trail North, Earth City, MO 63045, TEL (314)298-8566

Sample Summary

Client: Aptim Federal Services LLC
Project/Site: HPNS-Parcel G 501197

Job ID: 160-42413-1
SDG: GJ46599751

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
160-42413-1	HPPG-F-075	Solid	06/11/21 09:54	06/14/21 08:45
160-42413-2	HPPG-F-076	Solid	06/11/21 11:12	06/14/21 08:45
160-42413-3	HPPG-SFU-TU-115A-001	Solid	06/11/21 09:46	06/14/21 08:45
160-42413-4	HPPG-SFU-TU-115A-002	Solid	06/11/21 09:54	06/14/21 08:45
160-42413-5	HPPG-SFU-TU-115A-003	Solid	06/11/21 10:02	06/14/21 08:45
160-42413-6	HPPG-SFU-TU-115A-004	Solid	06/11/21 10:09	06/14/21 08:45
160-42413-7	HPPG-SFU-TU-115A-005	Solid	06/11/21 10:15	06/14/21 08:45
160-42413-8	HPPG-SFU-TU-115A-006	Solid	06/11/21 10:33	06/14/21 08:45
160-42413-9	HPPG-SFU-TU-115A-007	Solid	06/11/21 10:35	06/14/21 08:45
160-42413-10	HPPG-SFU-TU-115A-008	Solid	06/11/21 10:40	06/14/21 08:45
160-42413-11	HPPG-SFU-TU-115A-009	Solid	06/11/21 10:24	06/14/21 08:45
160-42413-12	HPPG-SFU-TU-115A-010	Solid	06/11/21 10:44	06/14/21 08:45
160-42413-13	HPPG-SFU-TU-115A-011	Solid	06/11/21 10:47	06/14/21 08:45
160-42413-14	HPPG-SFU-TU-115A-012	Solid	06/11/21 10:52	06/14/21 08:45
160-42413-15	HPPG-SFU-TU-115A-013	Solid	06/11/21 10:54	06/14/21 08:45
160-42413-16	HPPG-SFU-TU-115A-014	Solid	06/11/21 10:56	06/14/21 08:45
160-42413-17	HPPG-SFU-TU-115A-015	Solid	06/11/21 11:04	06/14/21 08:45
160-42413-18	HPPG-SFU-TU-115A-016	Solid	06/11/21 11:12	06/14/21 08:45
160-42413-19	HPPG-SFU-TU-115A-017	Solid	06/11/21 11:17	06/14/21 08:45
160-42413-20	HPPG-SFU-TU-115A-018	Solid	06/11/21 11:24	06/14/21 08:45
160-42413-21	HPPG-SFU-TU-115A-019	Solid	06/11/21 11:27	06/14/21 08:45
160-42413-22	HPPG-SFU-TU-115A-020	Solid	06/11/21 12:46	06/14/21 08:45
160-42413-23	HPPG-SFU-TU-115A-021	Solid	06/11/21 12:51	06/14/21 08:45
160-42413-24	HPPG-SFU-TU-115A-022	Solid	06/11/21 12:55	06/14/21 08:45
160-42413-25	HPPG-SFU-TU-115A-023	Solid	06/11/21 13:01	06/14/21 08:45
160-42413-26	HPPG-SFU-TU-115A-024	Solid	06/11/21 13:09	06/14/21 08:45
160-42413-27	HPPG-SFU-TU-115A-025	Solid	06/11/21 13:12	06/14/21 08:45

Client Sample Results

Client: Aptim Federal Services LLC
 Project/Site: HPNS-Parcel G 501197

Job ID: 160-42413-1
 SDG: GJ46599751

Client Sample ID: HPPG-F-075

Date Collected: 06/11/21 09:54
 Date Received: 06/14/21 08:45

Lab Sample ID: 160-42413-1

Matrix: Solid

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Actinium 228	0.229		0.131	0.133		0.0776	pCi/g	06/17/21 13:33	07/09/21 15:20	1
Actinium-227	0.0360	U	0.158	0.158		0.273	pCi/g	06/17/21 13:33	07/09/21 15:20	1
Americium-241	-0.0510	U	0.107	0.107		0.0647	pCi/g	06/17/21 13:33	07/09/21 15:20	1
Bismuth-212	0.310	U	0.500	0.501		0.382	pCi/g	06/17/21 13:33	07/09/21 15:20	1
Bismuth-214	0.273		0.0860	0.0905		0.0343	pCi/g	06/17/21 13:33	07/09/21 15:20	1
Cesium-137	-0.00229	U	0.0452	0.0452	0.0700	0.0370	pCi/g	06/17/21 13:33	07/09/21 15:20	1
Lead-210	0.000	U	0.633	0.633		0.772	pCi/g	06/17/21 13:33	07/09/21 15:20	1
Lead-212	0.308		0.0624	0.0741		0.0285	pCi/g	06/17/21 13:33	07/09/21 15:20	1
Lead-214	0.272		0.0759	0.0810		0.0411	pCi/g	06/17/21 13:33	07/09/21 15:20	1
Potassium-40	4.80		0.944	1.06		0.295	pCi/g	06/17/21 13:33	07/09/21 15:20	1
Protactinium-231	0.000	U	0.190	0.190		1.54	pCi/g	06/17/21 13:33	07/09/21 15:20	1
Protactinium-234	0.0471	U	0.0887	0.0888		0.161	pCi/g	06/17/21 13:33	07/09/21 15:20	1
Radium-226	0.273		0.0860	0.0905	0.200	0.0343	pCi/g	06/17/21 13:33	07/09/21 15:20	1
Radium-228	0.229		0.131	0.133		0.0776	pCi/g	06/17/21 13:33	07/09/21 15:20	1
Thallium-208	0.0722		0.0605	0.0610		0.0253	pCi/g	06/17/21 13:33	07/09/21 15:20	1
Thorium 228	0.308		0.0624	0.0741		0.0285	pCi/g	06/17/21 13:33	07/09/21 15:20	1
Thorium-232	0.229		0.131	0.133		0.0776	pCi/g	06/17/21 13:33	07/09/21 15:20	1
Thorium-234	0.340		0.311	0.314		0.189	pCi/g	06/17/21 13:33	07/09/21 15:20	1
Uranium-235	0.103	U	0.288	0.288		0.233	pCi/g	06/17/21 13:33	07/09/21 15:20	1
Uranium-238	0.340		0.311	0.314		0.189	pCi/g	06/17/21 13:33	07/09/21 15:20	1

Client Sample ID: HPPG-F-076

Date Collected: 06/11/21 11:12
 Date Received: 06/14/21 08:45

Lab Sample ID: 160-42413-2

Matrix: Solid

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Actinium 228	0.590		0.155	0.166		0.0275	pCi/g	06/17/21 13:33	07/09/21 15:23	1
Actinium-227	-0.203	U	0.608	0.608		0.371	pCi/g	06/17/21 13:33	07/09/21 15:23	1
Americium-241	-0.0666	U	0.160	0.160		0.129	pCi/g	06/17/21 13:33	07/09/21 15:23	1
Bismuth-212	0.230	U	0.787	0.788		0.630	pCi/g	06/17/21 13:33	07/09/21 15:23	1
Bismuth-214	0.375		0.127	0.133		0.0689	pCi/g	06/17/21 13:33	07/09/21 15:23	1
Cesium-137	-0.0370	U	0.0708	0.0709	0.0700	0.0555	pCi/g	06/17/21 13:33	07/09/21 15:23	1
Lead-210	0.769	U	1.42	1.42		0.933	pCi/g	06/17/21 13:33	07/09/21 15:23	1
Lead-212	0.461		0.0916	0.103		0.0446	pCi/g	06/17/21 13:33	07/09/21 15:23	1
Lead-214	0.450		0.121	0.129		0.0485	pCi/g	06/17/21 13:33	07/09/21 15:23	1
Potassium-40	5.15		1.02	1.15		0.255	pCi/g	06/17/21 13:33	07/09/21 15:23	1
Protactinium-231	-0.875	U	2.83	2.83		2.31	pCi/g	06/17/21 13:33	07/09/21 15:23	1
Protactinium-234	0.0911	U	0.215	0.215		0.226	pCi/g	06/17/21 13:33	07/09/21 15:23	1
Radium-226	0.375		0.127	0.133	0.200	0.0689	pCi/g	06/17/21 13:33	07/09/21 15:23	1
Radium-228	0.590		0.155	0.166		0.0275	pCi/g	06/17/21 13:33	07/09/21 15:23	1
Thallium-208	0.253		0.0629	0.0680		0.0153	pCi/g	06/17/21 13:33	07/09/21 15:23	1
Thorium 228	0.461		0.0916	0.103		0.0446	pCi/g	06/17/21 13:33	07/09/21 15:23	1
Thorium-232	0.590		0.155	0.166		0.0275	pCi/g	06/17/21 13:33	07/09/21 15:23	1
Thorium-234	0.682		0.466	0.472		0.436	pCi/g	06/17/21 13:33	07/09/21 15:23	1
Uranium-235	0.213	U	0.208	0.209		0.389	pCi/g	06/17/21 13:33	07/09/21 15:23	1

Eurofins TestAmerica, St. Louis

Client Sample Results

Client: Aptim Federal Services LLC
Project/Site: HPNS-Parcel G 501197

Job ID: 160-42413-1
SDG: GJ46599751

Client Sample ID: HPPG-F-076
Date Collected: 06/11/21 11:12
Date Received: 06/14/21 08:45

Lab Sample ID: 160-42413-2
Matrix: Solid

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS) (Continued)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Uranium-238	0.682		0.466	0.472		0.436	pCi/g	06/17/21 13:33	07/09/21 15:23	1

Client Sample ID: HPPG-SFU-TU-115A-001

Lab Sample ID: 160-42413-3
Matrix: Solid

Date Collected: 06/11/21 09:46
Date Received: 06/14/21 08:45

Method: 905 - Strontium-90 (GFPC)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Strontium-90	0.177		0.186	0.186	0.331	0.139	pCi/g	07/20/21 12:00	07/29/21 14:08	1
Carrier										
Sr Carrier	88.1		40 - 110					07/20/21 12:00	07/29/21 14:08	1
Y Carrier	93.5		40 - 110					07/20/21 12:00	07/29/21 14:08	1

Method: A-01-R - Isotopic Plutonium and Neptunium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Plutonium-238	-0.0363	U	0.0228	0.0230	0.100	0.0235	pCi/g	06/24/21 15:36	07/11/21 12:50	1
Plutonium-239/240	-0.0121	U	0.0128	0.0128	0.100	0.0133	pCi/g	06/24/21 15:36	07/11/21 12:50	1
Tracer										
Pu-242 (T)	85.2		30 - 110					06/24/21 15:36	07/11/21 12:50	1

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Thorium-228	0.706		0.0949	0.112	0.250	0.0319	pCi/g	06/24/21 17:12	07/08/21 22:12	1
Thorium-230	0.358		0.0827	0.0880	0.250	0.0393	pCi/g	06/24/21 17:12	07/08/21 22:12	1
Thorium-232	0.785		0.0920	0.113	0.250	0.0188	pCi/g	06/24/21 17:12	07/08/21 22:12	1
Tracer										
Thorium-229	73.0		30 - 110					06/24/21 17:12	07/08/21 22:12	1

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Actinium-228	0.361		0.107	0.113		0.0183	pCi/g	06/17/21 13:33	07/09/21 15:25	1
Actinium-227	0.145	U	0.298	0.298		0.208	pCi/g	06/17/21 13:33	07/09/21 15:25	1
Americium-241	0.0416	U	0.0931	0.0932		0.0749	pCi/g	06/17/21 13:33	07/09/21 15:25	1
Bismuth-212	0.0622	U	0.492	0.492		0.400	pCi/g	06/17/21 13:33	07/09/21 15:25	1
Bismuth-214	0.208		0.0861	0.0887		0.0405	pCi/g	06/17/21 13:33	07/09/21 15:25	1
Cesium-137	0.000	U	0.00592	0.00592	0.0700	0.0270	pCi/g	06/17/21 13:33	07/09/21 15:25	1
Lead-210	0.117	U	0.839	0.839		0.684	pCi/g	06/17/21 13:33	07/09/21 15:25	1
Lead-212	0.295		0.0565	0.0681		0.0238	pCi/g	06/17/21 13:33	07/09/21 15:25	1

Eurofins TestAmerica, St. Louis

Client Sample Results

Client: Aptim Federal Services LLC
 Project/Site: HPNS-Parcel G 501197

Job ID: 160-42413-1
 SDG: GJ46599751

Client Sample ID: HPPG-SFU-TU-115A-001

Lab Sample ID: 160-42413-3

Date Collected: 06/11/21 09:46
 Date Received: 06/14/21 08:45

Matrix: Solid

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS) (Continued)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Lead-214	0.275		0.0819	0.0867		0.0341	pCi/g	06/17/21 13:33	07/09/21 15:25	1
Potassium-40	5.11		0.796	0.953		0.0722	pCi/g	06/17/21 13:33	07/09/21 15:25	1
Protactinium-231	0.171	U	0.931	0.931		1.44	pCi/g	06/17/21 13:33	07/09/21 15:25	1
Protactinium-234	-0.0669	U	0.188	0.188		0.153	pCi/g	06/17/21 13:33	07/09/21 15:25	1
Radium-226	0.208		0.0861	0.0887	0.200	0.0405	pCi/g	06/17/21 13:33	07/09/21 15:25	1
Radium-228	0.361		0.107	0.113		0.0183	pCi/g	06/17/21 13:33	07/09/21 15:25	1
Thallium-208	0.110		0.0357	0.0374		0.0117	pCi/g	06/17/21 13:33	07/09/21 15:25	1
Thorium 228	0.295		0.0565	0.0681		0.0238	pCi/g	06/17/21 13:33	07/09/21 15:25	1
Thorium-232	0.361		0.107	0.113		0.0183	pCi/g	06/17/21 13:33	07/09/21 15:25	1
Thorium-234	-0.264	U	0.891	0.892		0.729	pCi/g	06/17/21 13:33	07/09/21 15:25	1
Uranium-235	0.0502	U	0.0944	0.0945		0.253	pCi/g	06/17/21 13:33	07/09/21 15:25	1
Uranium-238	-0.264	U	0.891	0.892		0.729	pCi/g	06/17/21 13:33	07/09/21 15:25	1

Client Sample ID: HPPG-SFU-TU-115A-002

Lab Sample ID: 160-42413-4

Date Collected: 06/11/21 09:54
 Date Received: 06/14/21 08:45

Matrix: Solid

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Actinium 228	0.375		0.119	0.125		0.0366	pCi/g	06/17/21 13:33	07/09/21 15:30	1
Actinium-227	0.0342	U	0.101	0.101		0.272	pCi/g	06/17/21 13:33	07/09/21 15:30	1
Americium-241	0.0847		0.0917	0.0922		0.0593	pCi/g	06/17/21 13:33	07/09/21 15:30	1
Bismuth-212	-0.0751	U	0.829	0.829		0.678	pCi/g	06/17/21 13:33	07/09/21 15:30	1
Bismuth-214	0.265		0.0928	0.0968		0.0330	pCi/g	06/17/21 13:33	07/09/21 15:30	1
Cesium-137	0.0206	U	0.0470	0.0470	0.0700	0.0364	pCi/g	06/17/21 13:33	07/09/21 15:30	1
Lead-210	0.571	U	0.981	0.983		0.679	pCi/g	06/17/21 13:33	07/09/21 15:30	1
Lead-212	0.248		0.0750	0.0816		0.0442	pCi/g	06/17/21 13:33	07/09/21 15:30	1
Lead-214	0.315		0.0915	0.0972		0.0384	pCi/g	06/17/21 13:33	07/09/21 15:30	1
Potassium-40	5.01		1.01	1.13		0.231	pCi/g	06/17/21 13:33	07/09/21 15:30	1
Protactinium-231	0.120	U	1.05	1.05		1.62	pCi/g	06/17/21 13:33	07/09/21 15:30	1
Protactinium-234	0.0431	U	0.153	0.153		0.124	pCi/g	06/17/21 13:33	07/09/21 15:30	1
Radium-226	0.265		0.0928	0.0968	0.200	0.0330	pCi/g	06/17/21 13:33	07/09/21 15:30	1
Radium-228	0.375		0.119	0.125		0.0366	pCi/g	06/17/21 13:33	07/09/21 15:30	1
Thallium-208	0.0955		0.0599	0.0607		0.0286	pCi/g	06/17/21 13:33	07/09/21 15:30	1
Thorium 228	0.248		0.0750	0.0816		0.0442	pCi/g	06/17/21 13:33	07/09/21 15:30	1
Thorium-232	0.375		0.119	0.125		0.0366	pCi/g	06/17/21 13:33	07/09/21 15:30	1
Thorium-234	-0.0208	U	0.0964	0.0964		0.615	pCi/g	06/17/21 13:33	07/09/21 15:30	1
Uranium-235	0.0958	U	0.214	0.214		0.149	pCi/g	06/17/21 13:33	07/09/21 15:30	1
Uranium-238	-0.0208	U	0.0964	0.0964		0.615	pCi/g	06/17/21 13:33	07/09/21 15:30	1

Eurofins TestAmerica, St. Louis

Client Sample Results

Client: Aptim Federal Services LLC
 Project/Site: HPNS-Parcel G 501197

Job ID: 160-42413-1
 SDG: GJ46599751

Client Sample ID: HPPG-SFU-TU-115A-003

Lab Sample ID: 160-42413-5

Date Collected: 06/11/21 10:02
 Date Received: 06/14/21 08:45

Matrix: Solid

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			(2σ+/-)	(2σ+/-)						
Actinium 228	0.218		0.187	0.188		0.0813	pCi/g	06/17/21 13:33	07/10/21 07:19	1
Actinium-227	0.0662	U	0.332	0.332		0.286	pCi/g	06/17/21 13:33	07/10/21 07:19	1
Americium-241	0.0246	U	0.0933	0.0934		0.0638	pCi/g	06/17/21 13:33	07/10/21 07:19	1
Bismuth-212	0.329	U	0.695	0.696		0.532	pCi/g	06/17/21 13:33	07/10/21 07:19	1
Bismuth-214	0.249		0.141	0.143		0.0554	pCi/g	06/17/21 13:33	07/10/21 07:19	1
Cesium-137	0.0111	U	0.0585	0.0585	0.0700	0.0466	pCi/g	06/17/21 13:33	07/10/21 07:19	1
Lead-210	0.677		0.769	0.773		0.505	pCi/g	06/17/21 13:33	07/10/21 07:19	1
Lead-212	0.262		0.0785	0.0855		0.0415	pCi/g	06/17/21 13:33	07/10/21 07:19	1
Lead-214	0.218		0.0772	0.0804		0.0366	pCi/g	06/17/21 13:33	07/10/21 07:19	1
Potassium-40	4.20		1.42	1.49		0.540	pCi/g	06/17/21 13:33	07/10/21 07:19	1
Protactinium-231	-0.0000001	U	1.94	1.94		1.60	pCi/g	06/17/21 13:33	07/10/21 07:19	1
	19									
Protactinium-234	0.0105	U	0.0226	0.0227		0.142	pCi/g	06/17/21 13:33	07/10/21 07:19	1
Radium-226	0.249		0.141	0.143	0.200	0.0554	pCi/g	06/17/21 13:33	07/10/21 07:19	1
Radium-228	0.218		0.187	0.188		0.0813	pCi/g	06/17/21 13:33	07/10/21 07:19	1
Thallium-208	0.104		0.0403	0.0417		0.00859	pCi/g	06/17/21 13:33	07/10/21 07:19	1
Thorium 228	0.262		0.0785	0.0855		0.0415	pCi/g	06/17/21 13:33	07/10/21 07:19	1
Thorium-232	0.218		0.187	0.188		0.0813	pCi/g	06/17/21 13:33	07/10/21 07:19	1
Thorium-234	-0.256	U	0.679	0.679		0.569	pCi/g	06/17/21 13:33	07/10/21 07:19	1
Uranium-235	0.0612	U	0.209	0.209		0.161	pCi/g	06/17/21 13:33	07/10/21 07:19	1
Uranium-238	-0.256	U	0.679	0.679		0.569	pCi/g	06/17/21 13:33	07/10/21 07:19	1

Client Sample ID: HPPG-SFU-TU-115A-004

Lab Sample ID: 160-42413-6

Date Collected: 06/11/21 10:09
 Date Received: 06/14/21 08:45

Matrix: Solid

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			(2σ+/-)	(2σ+/-)						
Actinium 228	0.378		0.115	0.122		0.0679	pCi/g	06/17/21 13:33	07/10/21 06:02	1
Actinium-227	0.121	U	0.239	0.240		0.201	pCi/g	06/17/21 13:33	07/10/21 06:02	1
Americium-241	0.0507	U	0.112	0.112		0.0900	pCi/g	06/17/21 13:33	07/10/21 06:02	1
Bismuth-212	0.203	U	0.455	0.456		0.353	pCi/g	06/17/21 13:33	07/10/21 06:02	1
Bismuth-214	0.253		0.0774	0.0817		0.0295	pCi/g	06/17/21 13:33	07/10/21 06:02	1
Cesium-137	-0.00883	U	0.0389	0.0389	0.0700	0.0311	pCi/g	06/17/21 13:33	07/10/21 06:02	1
Lead-210	0.449	U	0.843	0.844		0.663	pCi/g	06/17/21 13:33	07/10/21 06:02	1
Lead-212	0.270		0.0574	0.0672		0.0227	pCi/g	06/17/21 13:33	07/10/21 06:02	1
Lead-214	0.297		0.0733	0.0795		0.0376	pCi/g	06/17/21 13:33	07/10/21 06:02	1
Potassium-40	5.51		0.943	1.10		0.237	pCi/g	06/17/21 13:33	07/10/21 06:02	1
Protactinium-231	0.270	U	1.00	1.00		1.58	pCi/g	06/17/21 13:33	07/10/21 06:02	1
Protactinium-234	-0.0693	U	0.199	0.199		0.161	pCi/g	06/17/21 13:33	07/10/21 06:02	1
Radium-226	0.253		0.0774	0.0817	0.200	0.0295	pCi/g	06/17/21 13:33	07/10/21 06:02	1
Radium-228	0.378		0.115	0.122		0.0679	pCi/g	06/17/21 13:33	07/10/21 06:02	1
Thallium-208	0.0946		0.0370	0.0383		0.0139	pCi/g	06/17/21 13:33	07/10/21 06:02	1
Thorium 228	0.270		0.0574	0.0672		0.0227	pCi/g	06/17/21 13:33	07/10/21 06:02	1
Thorium-232	0.378		0.115	0.122		0.0679	pCi/g	06/17/21 13:33	07/10/21 06:02	1
Thorium-234	0.111	U	0.242	0.243		0.745	pCi/g	06/17/21 13:33	07/10/21 06:02	1

Eurofins TestAmerica, St. Louis

Client Sample Results

Client: Aptim Federal Services LLC
Project/Site: HPNS-Parcel G 501197

Job ID: 160-42413-1
SDG: GJ46599751

Client Sample ID: HPPG-SFU-TU-115A-004

Lab Sample ID: 160-42413-6

Date Collected: 06/11/21 10:09

Matrix: Solid

Date Received: 06/14/21 08:45

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS) (Continued)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	(2σ+/-)						
Uranium-235	0.0245	U		0.0487	0.0488		0.283	pCi/g	06/17/21 13:33	07/10/21 06:02
Uranium-238	0.111	U		0.242	0.243		0.745	pCi/g	06/17/21 13:33	07/10/21 06:02

Client Sample ID: HPPG-SFU-TU-115A-005

Lab Sample ID: 160-42413-7

Date Collected: 06/11/21 10:15

Matrix: Solid

Date Received: 06/14/21 08:45

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	(2σ+/-)						
Actinium-228	0.110	U		0.252	0.252		0.128	pCi/g	06/17/21 13:33	07/10/21 06:04
Actinium-227	-0.217	U		0.507	0.507		0.305	pCi/g	06/17/21 13:33	07/10/21 06:04
Americium-241	-0.0619	U		0.164	0.164		0.133	pCi/g	06/17/21 13:33	07/10/21 06:04
Bismuth-212	0.266	U		0.514	0.514		0.388	pCi/g	06/17/21 13:33	07/10/21 06:04
Bismuth-214	0.330			0.114	0.118		0.0494	pCi/g	06/17/21 13:33	07/10/21 06:04
Cesium-137	-0.00551	U		0.0481	0.0481	0.0700	0.0390	pCi/g	06/17/21 13:33	07/10/21 06:04
Lead-210	0.0767	U		1.33	1.33		1.09	pCi/g	06/17/21 13:33	07/10/21 06:04
Lead-212	0.203			0.0656	0.0689		0.0348	pCi/g	06/17/21 13:33	07/10/21 06:04
Lead-214	0.221			0.115	0.117		0.0561	pCi/g	06/17/21 13:33	07/10/21 06:04
Potassium-40	5.00			1.03	1.15		0.264	pCi/g	06/17/21 13:33	07/10/21 06:04
Protactinium-231	-0.792	U		2.70	2.70		2.19	pCi/g	06/17/21 13:33	07/10/21 06:04
Protactinium-234	0.236			0.172	0.173		0.186	pCi/g	06/17/21 13:33	07/10/21 06:04
Radium-226	0.330			0.114	0.118	0.200	0.0494	pCi/g	06/17/21 13:33	07/10/21 06:04
Radium-228	0.110	U		0.252	0.252		0.128	pCi/g	06/17/21 13:33	07/10/21 06:04
Thallium-208	0.0253	U		0.0742	0.0743		0.0417	pCi/g	06/17/21 13:33	07/10/21 06:04
Thorium-228	0.203			0.0656	0.0689		0.0348	pCi/g	06/17/21 13:33	07/10/21 06:04
Thorium-232	0.110	U		0.252	0.252		0.128	pCi/g	06/17/21 13:33	07/10/21 06:04
Thorium-234	0.451			0.506	0.509		0.329	pCi/g	06/17/21 13:33	07/10/21 06:04
Uranium-235	-0.161	U		0.474	0.475		0.386	pCi/g	06/17/21 13:33	07/10/21 06:04
Uranium-238	0.451			0.506	0.509		0.329	pCi/g	06/17/21 13:33	07/10/21 06:04

Client Sample ID: HPPG-SFU-TU-115A-006

Lab Sample ID: 160-42413-8

Date Collected: 06/11/21 10:33

Matrix: Solid

Date Received: 06/14/21 08:45

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	(2σ+/-)						
Actinium-228	0.227			0.151	0.153		0.0645	pCi/g	06/17/21 13:33	07/10/21 06:35
Actinium-227	0.0840	U		0.185	0.185		0.222	pCi/g	06/17/21 13:33	07/10/21 06:35
Americium-241	0.0419	U		0.0865	0.0866		0.0522	pCi/g	06/17/21 13:33	07/10/21 06:35
Bismuth-212	0.221	U		0.583	0.583		0.462	pCi/g	06/17/21 13:33	07/10/21 06:35
Bismuth-214	0.315			0.0811	0.0874		0.0281	pCi/g	06/17/21 13:33	07/10/21 06:35
Cesium-137	-0.0382	U		0.0613	0.0614	0.0700	0.0481	pCi/g	06/17/21 13:33	07/10/21 06:35
Lead-210	0.393	U		1.01	1.01		0.807	pCi/g	06/17/21 13:33	07/10/21 06:35
Lead-212	0.284			0.0597	0.0701		0.0265	pCi/g	06/17/21 13:33	07/10/21 06:35

Eurofins TestAmerica, St. Louis

Client Sample Results

Client: Aptim Federal Services LLC
 Project/Site: HPNS-Parcel G 501197

Job ID: 160-42413-1
 SDG: GJ46599751

Client Sample ID: HPPG-SFU-TU-115A-006

Date Collected: 06/11/21 10:33
 Date Received: 06/14/21 08:45

Lab Sample ID: 160-42413-8

Matrix: Solid

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS) (Continued)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			(2σ+/-)	(2σ+/-)						
Lead-214	0.190		0.0691	0.0719		0.0353	pCi/g	06/17/21 13:33	07/10/21 06:35	1
Potassium-40	4.80		0.814	0.951		0.0805	pCi/g	06/17/21 13:33	07/10/21 06:35	1
Protactinium-231	0.449	U		1.20	1.20	1.31	pCi/g	06/17/21 13:33	07/10/21 06:35	1
Protactinium-234	0.136	U	0.0904	0.0915		0.149	pCi/g	06/17/21 13:33	07/10/21 06:35	1
Radium-226	0.315		0.0811	0.0874	0.200	0.0281	pCi/g	06/17/21 13:33	07/10/21 06:35	1
Radium-228	0.227		0.151	0.153		0.0645	pCi/g	06/17/21 13:33	07/10/21 06:35	1
Thallium-208	0.0687		0.0426	0.0432		0.0182	pCi/g	06/17/21 13:33	07/10/21 06:35	1
Thorium 228	0.284		0.0597	0.0701		0.0265	pCi/g	06/17/21 13:33	07/10/21 06:35	1
Thorium-232	0.227		0.151	0.153		0.0645	pCi/g	06/17/21 13:33	07/10/21 06:35	1
Thorium-234	0.255	U	0.585	0.586		0.473	pCi/g	06/17/21 13:33	07/10/21 06:35	1
Uranium-235	-0.0833	U	0.329	0.329		0.268	pCi/g	06/17/21 13:33	07/10/21 06:35	1
Uranium-238	0.255	U	0.585	0.586		0.473	pCi/g	06/17/21 13:33	07/10/21 06:35	1

Client Sample ID: HPPG-SFU-TU-115A-007

Date Collected: 06/11/21 10:35
 Date Received: 06/14/21 08:45

Lab Sample ID: 160-42413-9

Matrix: Solid

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			(2σ+/-)	(2σ+/-)						
Actinium 228	0.104	U	0.140	0.140		0.110	pCi/g	06/17/21 13:33	07/10/21 06:05	1
Actinium-227	0.0655	U	0.272	0.272		0.253	pCi/g	06/17/21 13:33	07/10/21 06:05	1
Americium-241	-0.00634	U	0.102	0.102		0.0700	pCi/g	06/17/21 13:33	07/10/21 06:05	1
Bismuth-212	0.185	U	0.566	0.566		0.445	pCi/g	06/17/21 13:33	07/10/21 06:05	1
Bismuth-214	0.108		0.0853	0.0861		0.101	pCi/g	06/17/21 13:33	07/10/21 06:05	1
Cesium-137	-0.0325	U	0.0590	0.0591	0.0700	0.0457	pCi/g	06/17/21 13:33	07/10/21 06:05	1
Lead-210	0.482	U	0.884	0.886		0.618	pCi/g	06/17/21 13:33	07/10/21 06:05	1
Lead-212	0.293		0.0802	0.0887		0.0463	pCi/g	06/17/21 13:33	07/10/21 06:05	1
Lead-214	0.212		0.123	0.125		0.0883	pCi/g	06/17/21 13:33	07/10/21 06:05	1
Potassium-40	5.58		1.07	1.21		0.234	pCi/g	06/17/21 13:33	07/10/21 06:05	1
Protactinium-231	0.529	U	1.41	1.41		1.55	pCi/g	06/17/21 13:33	07/10/21 06:05	1
Protactinium-234	0.104	U	0.189	0.189		0.129	pCi/g	06/17/21 13:33	07/10/21 06:05	1
Radium-226	0.108		0.0853	0.0861	0.200	0.101	pCi/g	06/17/21 13:33	07/10/21 06:05	1
Radium-228	0.104	U	0.140	0.140		0.110	pCi/g	06/17/21 13:33	07/10/21 06:05	1
Thallium-208	0.144		0.0436	0.0461		0.0117	pCi/g	06/17/21 13:33	07/10/21 06:05	1
Thorium 228	0.293		0.0802	0.0887		0.0463	pCi/g	06/17/21 13:33	07/10/21 06:05	1
Thorium-232	0.104	U	0.140	0.140		0.110	pCi/g	06/17/21 13:33	07/10/21 06:05	1
Thorium-234	0.0500	U	0.390	0.390		0.316	pCi/g	06/17/21 13:33	07/10/21 06:05	1
Uranium-235	0.0606	U	0.135	0.135		0.232	pCi/g	06/17/21 13:33	07/10/21 06:05	1
Uranium-238	0.0500	U	0.390	0.390		0.316	pCi/g	06/17/21 13:33	07/10/21 06:05	1

Eurofins TestAmerica, St. Louis

Client Sample Results

Client: Aptim Federal Services LLC
Project/Site: HPNS-Parcel G 501197

Job ID: 160-42413-1
SDG: GJ46599751

Client Sample ID: HPPG-SFU-TU-115A-008

Lab Sample ID: 160-42413-10

Date Collected: 06/11/21 10:40
Date Received: 06/14/21 08:45

Matrix: Solid

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			(2σ+/-)	(2σ+/-)						
Actinium 228	0.156	U	0.252	0.253		0.158	pCi/g	06/17/21 13:33	07/10/21 06:04	1
Actinium-227	0.0778	U	0.447	0.447		0.326	pCi/g	06/17/21 13:33	07/10/21 06:04	1
Americium-241	-0.0164	U	0.159	0.159		0.130	pCi/g	06/17/21 13:33	07/10/21 06:04	1
Bismuth-212	0.000	U	0.408	0.408		0.400	pCi/g	06/17/21 13:33	07/10/21 06:04	1
Bismuth-214	0.0298	U	0.213	0.213		0.173	pCi/g	06/17/21 13:33	07/10/21 06:04	1
Cesium-137	-0.00397	U	0.0359	0.0359	0.0700	0.0403	pCi/g	06/17/21 13:33	07/10/21 06:04	1
Lead-210	-0.785	U	2.07	2.07		1.73	pCi/g	06/17/21 13:33	07/10/21 06:04	1
Lead-212	0.350		0.0875	0.0967		0.0423	pCi/g	06/17/21 13:33	07/10/21 06:04	1
Lead-214	0.352		0.0959	0.104		0.0475	pCi/g	06/17/21 13:33	07/10/21 06:04	1
Potassium-40	4.39		1.09	1.20		0.331	pCi/g	06/17/21 13:33	07/10/21 06:04	1
Protactinium-231	-0.272	U	2.67	2.67		2.19	pCi/g	06/17/21 13:33	07/10/21 06:04	1
Protactinium-234	0.207	U	0.221	0.222		0.225	pCi/g	06/17/21 13:33	07/10/21 06:04	1
Radium-226	0.0298	U	0.213	0.213	0.200	0.173	pCi/g	06/17/21 13:33	07/10/21 06:04	1
Radium-228	0.156	U	0.252	0.253		0.158	pCi/g	06/17/21 13:33	07/10/21 06:04	1
Thallium-208	0.105		0.0558	0.0571		0.0247	pCi/g	06/17/21 13:33	07/10/21 06:04	1
Thorium 228	0.350		0.0875	0.0967		0.0423	pCi/g	06/17/21 13:33	07/10/21 06:04	1
Thorium-232	0.156	U	0.252	0.253		0.158	pCi/g	06/17/21 13:33	07/10/21 06:04	1
Thorium-234	0.646		0.565	0.571		0.380	pCi/g	06/17/21 13:33	07/10/21 06:04	1
Uranium-235	0.114	U	0.414	0.414		0.406	pCi/g	06/17/21 13:33	07/10/21 06:04	1
Uranium-238	0.646		0.565	0.571		0.380	pCi/g	06/17/21 13:33	07/10/21 06:04	1

Client Sample ID: HPPG-SFU-TU-115A-009

Lab Sample ID: 160-42413-11

Date Collected: 06/11/21 10:24
Date Received: 06/14/21 08:45

Matrix: Solid

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			(2σ+/-)	(2σ+/-)						
Actinium 228	0.197		0.174	0.175		0.0807	pCi/g	06/17/21 13:33	07/10/21 06:36	1
Actinium-227	0.110	U	0.217	0.217		0.182	pCi/g	06/17/21 13:33	07/10/21 06:36	1
Americium-241	0.0381	U	0.0837	0.0838		0.0668	pCi/g	06/17/21 13:33	07/10/21 06:36	1
Bismuth-212	0.161	U	0.501	0.501		0.397	pCi/g	06/17/21 13:33	07/10/21 06:36	1
Bismuth-214	0.101	U	0.0822	0.0829		0.110	pCi/g	06/17/21 13:33	07/10/21 06:36	1
Cesium-137	-0.0230	U	0.0501	0.0501	0.0700	0.0394	pCi/g	06/17/21 13:33	07/10/21 06:36	1
Lead-210	0.000	U	0.608	0.608		0.729	pCi/g	06/17/21 13:33	07/10/21 06:36	1
Lead-212	0.243		0.0762	0.0824		0.0335	pCi/g	06/17/21 13:33	07/10/21 06:36	1
Lead-214	0.179		0.0884	0.0903		0.0599	pCi/g	06/17/21 13:33	07/10/21 06:36	1
Potassium-40	5.17		0.901	1.04		0.230	pCi/g	06/17/21 13:33	07/10/21 06:36	1
Protactinium-231	0.000	U	0.197	0.197		1.43	pCi/g	06/17/21 13:33	07/10/21 06:36	1
Protactinium-234	0.134		0.0776	0.0788		0.120	pCi/g	06/17/21 13:33	07/10/21 06:36	1
Radium-226	0.101	U	0.0822	0.0829	0.200	0.110	pCi/g	06/17/21 13:33	07/10/21 06:36	1
Radium-228	0.197		0.174	0.175		0.0807	pCi/g	06/17/21 13:33	07/10/21 06:36	1
Thallium-208	0.0600		0.0373	0.0378		0.0155	pCi/g	06/17/21 13:33	07/10/21 06:36	1
Thorium 228	0.243		0.0762	0.0824		0.0335	pCi/g	06/17/21 13:33	07/10/21 06:36	1
Thorium-232	0.197		0.174	0.175		0.0807	pCi/g	06/17/21 13:33	07/10/21 06:36	1
Thorium-234	0.136	U	0.316	0.316		0.622	pCi/g	06/17/21 13:33	07/10/21 06:36	1
Uranium-235	0.000	U	0.0996	0.0996		0.240	pCi/g	06/17/21 13:33	07/10/21 06:36	1

Eurofins TestAmerica, St. Louis

Client Sample Results

Client: Aptim Federal Services LLC
Project/Site: HPNS-Parcel G 501197

Job ID: 160-42413-1
SDG: GJ46599751

Client Sample ID: HPPG-SFU-TU-115A-009
Date Collected: 06/11/21 10:24
Date Received: 06/14/21 08:45

Lab Sample ID: 160-42413-11
Matrix: Solid

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS) (Continued)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Uranium-238	0.136	U	0.316	0.316		0.622	pCi/g	06/17/21 13:33	07/10/21 06:36	1

Client Sample ID: HPPG-SFU-TU-115A-010
Date Collected: 06/11/21 10:44
Date Received: 06/14/21 08:45

Lab Sample ID: 160-42413-12
Matrix: Solid

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Actinium 228	0.477		0.172	0.181		0.0332	pCi/g	06/17/21 14:30	07/10/21 06:43	1
Actinium-227	0.131	U	0.318	0.318		0.290	pCi/g	06/17/21 14:30	07/10/21 06:43	1
Americium-241	-0.0735	U	0.176	0.176		0.142	pCi/g	06/17/21 14:30	07/10/21 06:43	1
Bismuth-212	0.000	U	0.460	0.460		0.585	pCi/g	06/17/21 14:30	07/10/21 06:43	1
Bismuth-214	0.369		0.112	0.120		0.0389	pCi/g	06/17/21 14:30	07/10/21 06:43	1
Cesium-137	0.0315	U	0.0588	0.0589	0.0700	0.0450	pCi/g	06/17/21 14:30	07/10/21 06:43	1
Lead-210	0.0974	U	1.75	1.76		1.43	pCi/g	06/17/21 14:30	07/10/21 06:43	1
Lead-212	0.360		0.0919	0.101		0.0494	pCi/g	06/17/21 14:30	07/10/21 06:43	1
Lead-214	0.400		0.108	0.118		0.0521	pCi/g	06/17/21 14:30	07/10/21 06:43	1
Potassium-40	6.88		1.28	1.50		0.311	pCi/g	06/17/21 14:30	07/10/21 06:43	1
Protactinium-231	-0.763	U	2.66	2.66		2.16	pCi/g	06/17/21 14:30	07/10/21 06:43	1
Protactinium-234	-0.0189	U	0.0492	0.0492		0.272	pCi/g	06/17/21 14:30	07/10/21 06:43	1
Radium-226	0.369		0.112	0.120	0.200	0.0389	pCi/g	06/17/21 14:30	07/10/21 06:43	1
Radium-228	0.477		0.172	0.181		0.0332	pCi/g	06/17/21 14:30	07/10/21 06:43	1
Thallium-208	0.115		0.0733	0.0745		0.0369	pCi/g	06/17/21 14:30	07/10/21 06:43	1
Thorium 228	0.360		0.0919	0.101		0.0494	pCi/g	06/17/21 14:30	07/10/21 06:43	1
Thorium-232	0.477		0.172	0.181		0.0332	pCi/g	06/17/21 14:30	07/10/21 06:43	1
Thorium-234	-0.0410	U	1.17	1.17		0.965	pCi/g	06/17/21 14:30	07/10/21 06:43	1
Uranium-235	0.128	U	0.318	0.318		0.293	pCi/g	06/17/21 14:30	07/10/21 06:43	1
Uranium-238	-0.0410	U	1.17	1.17		0.965	pCi/g	06/17/21 14:30	07/10/21 06:43	1

Client Sample ID: HPPG-SFU-TU-115A-011
Date Collected: 06/11/21 10:47
Date Received: 06/14/21 08:45

Lab Sample ID: 160-42413-13
Matrix: Solid

Method: 905 - Strontium-90 (GFPC)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Strontium-90	0.196		0.196	0.196	0.331	0.147	pCi/g	07/20/21 12:00	07/29/21 19:08	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Sr Carrier	85.2		40 - 110					07/20/21 12:00	07/29/21 19:08	1
Y Carrier	93.2		40 - 110					07/20/21 12:00	07/29/21 19:08	1

Eurofins TestAmerica, St. Louis

Client Sample Results

Client: Aptim Federal Services LLC
 Project/Site: HPNS-Parcel G 501197

Job ID: 160-42413-1
 SDG: GJ46599751

Client Sample ID: HPPG-SFU-TU-115A-011

Lab Sample ID: 160-42413-13

Date Collected: 06/11/21 10:47

Matrix: Solid

Date Received: 06/14/21 08:45

Method: A-01-R - Isotopic Plutonium and Neptunium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			(2σ+/-)	(2σ+/-)						
Plutonium-238	-0.0211	U	0.0298	0.0298	0.100	0.0268	pCi/g	06/24/21 15:36	07/11/21 12:50	1
Plutonium-239/240	-0.0127	U	0.0146	0.0146	0.100	0.0147	pCi/g	06/24/21 15:36	07/11/21 12:50	1
<i>Tracer</i>	%Yield	Qualifier	<i>Limits</i>						<i>Prepared</i>	<i>Analyzed</i>
Pu-242 (T)	82.5		30 - 110						06/24/21 15:36	07/11/21 12:50

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			(2σ+/-)	(2σ+/-)						
Thorium-228	0.181		0.0590	0.0609	0.250	0.0310	pCi/g	06/24/21 17:12	07/08/21 22:12	1
Thorium-230	0.190		0.0626	0.0646	0.250	0.0290	pCi/g	06/24/21 17:12	07/08/21 22:12	1
Thorium-232	0.249		0.0517	0.0558	0.250	0.0138	pCi/g	06/24/21 17:12	07/08/21 22:12	1
<i>Tracer</i>	%Yield	Qualifier	<i>Limits</i>						<i>Prepared</i>	<i>Analyzed</i>
Thorium-229	75.1		30 - 110						06/24/21 17:12	07/08/21 22:12

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			(2σ+/-)	(2σ+/-)						
Actinium 228	0.325		0.213	0.215		0.0975	pCi/g	06/17/21 14:30	07/10/21 06:42	1
Actinium-227	0.0293	U	0.109	0.109		0.323	pCi/g	06/17/21 14:30	07/10/21 06:42	1
Americium-241	-0.0532	U	0.120	0.120		0.0812	pCi/g	06/17/21 14:30	07/10/21 06:42	1
Bismuth-212	0.294	U	0.583	0.584		0.445	pCi/g	06/17/21 14:30	07/10/21 06:42	1
Bismuth-214	0.350		0.0951	0.102		0.0257	pCi/g	06/17/21 14:30	07/10/21 06:42	1
Cesium-137	-0.0308	U	0.0570	0.0571	0.0700	0.0439	pCi/g	06/17/21 14:30	07/10/21 06:42	1
Lead-210	-0.403	U	1.15	1.15		0.842	pCi/g	06/17/21 14:30	07/10/21 06:42	1
Lead-212	0.00410	U	0.125	0.125		0.103	pCi/g	06/17/21 14:30	07/10/21 06:42	1
Lead-214	0.197		0.110	0.112		0.0759	pCi/g	06/17/21 14:30	07/10/21 06:42	1
Potassium-40	4.95		1.04	1.16		0.247	pCi/g	06/17/21 14:30	07/10/21 06:42	1
Protactinium-231	0.311	U	1.04	1.04		1.66	pCi/g	06/17/21 14:30	07/10/21 06:42	1
Protactinium-234	0.0619	U	0.159	0.160		0.128	pCi/g	06/17/21 14:30	07/10/21 06:42	1
Radium-226	0.350		0.0951	0.102	0.200	0.0257	pCi/g	06/17/21 14:30	07/10/21 06:42	1
Radium-228	0.325		0.213	0.215		0.0975	pCi/g	06/17/21 14:30	07/10/21 06:42	1
Thallium-208	0.155		0.0456	0.0484		0.0124	pCi/g	06/17/21 14:30	07/10/21 06:42	1
Thorium 228	0.00410	U	0.125	0.125		0.103	pCi/g	06/17/21 14:30	07/10/21 06:42	1
Thorium-232	0.325		0.213	0.215		0.0975	pCi/g	06/17/21 14:30	07/10/21 06:42	1
Thorium-234	-0.691	U	0.396	0.404		0.783	pCi/g	06/17/21 14:30	07/10/21 06:42	1
Uranium-235	0.110	U	0.260	0.260		0.209	pCi/g	06/17/21 14:30	07/10/21 06:42	1
Uranium-238	-0.691	U	0.396	0.404		0.783	pCi/g	06/17/21 14:30	07/10/21 06:42	1

Eurofins TestAmerica, St. Louis

Client Sample Results

Client: Aptim Federal Services LLC
Project/Site: HPNS-Parcel G 501197

Job ID: 160-42413-1
SDG: GJ46599751

Client Sample ID: HPPG-SFU-TU-115A-012

Lab Sample ID: 160-42413-14

Date Collected: 06/11/21 10:52
Date Received: 06/14/21 08:45

Matrix: Solid

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			(2σ+/-)	(2σ+/-)						
Actinium 228	0.201		0.136	0.138		0.105	pCi/g	06/17/21 14:30	07/10/21 06:44	1
Actinium-227	-0.0287	U	0.447	0.447		0.277	pCi/g	06/17/21 14:30	07/10/21 06:44	1
Americium-241	-0.0644	U	0.0908	0.0911		0.125	pCi/g	06/17/21 14:30	07/10/21 06:44	1
Bismuth-212	-0.424	U	0.739	0.740		0.576	pCi/g	06/17/21 14:30	07/10/21 06:44	1
Bismuth-214	0.244		0.0913	0.0948		0.0389	pCi/g	06/17/21 14:30	07/10/21 06:44	1
Cesium-137	-0.0149	U	0.0467	0.0467	0.0700	0.0370	pCi/g	06/17/21 14:30	07/10/21 06:44	1
Lead-210	0.211	U	1.05	1.05		0.719	pCi/g	06/17/21 14:30	07/10/21 06:44	1
Lead-212	0.276		0.0684	0.0772		0.0337	pCi/g	06/17/21 14:30	07/10/21 06:44	1
Lead-214	0.251		0.108	0.111		0.0522	pCi/g	06/17/21 14:30	07/10/21 06:44	1
Potassium-40	5.69		1.11	1.25		0.330	pCi/g	06/17/21 14:30	07/10/21 06:44	1
Protactinium-231	-0.598	U	1.88	1.88		1.53	pCi/g	06/17/21 14:30	07/10/21 06:44	1
Protactinium-234	0.0684	U	0.214	0.214		0.174	pCi/g	06/17/21 14:30	07/10/21 06:44	1
Radium-226	0.244		0.0913	0.0948	0.200	0.0389	pCi/g	06/17/21 14:30	07/10/21 06:44	1
Radium-228	0.201		0.136	0.138		0.105	pCi/g	06/17/21 14:30	07/10/21 06:44	1
Thallium-208	0.108		0.0455	0.0468		0.0199	pCi/g	06/17/21 14:30	07/10/21 06:44	1
Thorium 228	0.276		0.0684	0.0772		0.0337	pCi/g	06/17/21 14:30	07/10/21 06:44	1
Thorium-232	0.201		0.136	0.138		0.105	pCi/g	06/17/21 14:30	07/10/21 06:44	1
Thorium-234	-0.933	U	0.519	0.529		0.736	pCi/g	06/17/21 14:30	07/10/21 06:44	1
Uranium-235	0.0494	U	0.120	0.120		0.322	pCi/g	06/17/21 14:30	07/10/21 06:44	1
Uranium-238	-0.933	U	0.519	0.529		0.736	pCi/g	06/17/21 14:30	07/10/21 06:44	1

Client Sample ID: HPPG-SFU-TU-115A-013

Lab Sample ID: 160-42413-15

Date Collected: 06/11/21 10:54
Date Received: 06/14/21 08:45

Matrix: Solid

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			(2σ+/-)	(2σ+/-)						
Actinium 228	0.326		0.124	0.128		0.0718	pCi/g	06/17/21 14:30	07/10/21 07:14	1
Actinium-227	-0.250	U	0.485	0.486		0.281	pCi/g	06/17/21 14:30	07/10/21 07:14	1
Americium-241	0.0454	U	0.0922	0.0923		0.0739	pCi/g	06/17/21 14:30	07/10/21 07:14	1
Bismuth-212	0.0171	U	0.475	0.475		0.390	pCi/g	06/17/21 14:30	07/10/21 07:14	1
Bismuth-214	0.0965		0.0625	0.0633		0.0836	pCi/g	06/17/21 14:30	07/10/21 07:14	1
Cesium-137	-0.000354	U	0.0371	0.0371	0.0700	0.0305	pCi/g	06/17/21 14:30	07/10/21 07:14	1
Lead-210	-0.508	U	1.12	1.12		0.902	pCi/g	06/17/21 14:30	07/10/21 07:14	1
Lead-212	0.280		0.0551	0.0660		0.0228	pCi/g	06/17/21 14:30	07/10/21 07:14	1
Lead-214	0.249		0.0621	0.0672		0.0329	pCi/g	06/17/21 14:30	07/10/21 07:14	1
Potassium-40	4.79		0.817	0.952		0.205	pCi/g	06/17/21 14:30	07/10/21 07:14	1
Protactinium-231	0.000	U	0.143	0.143		1.34	pCi/g	06/17/21 14:30	07/10/21 07:14	1
Protactinium-234	0.0523	U	0.150	0.150		0.121	pCi/g	06/17/21 14:30	07/10/21 07:14	1
Radium-226	0.0965		0.0625	0.0633	0.200	0.0836	pCi/g	06/17/21 14:30	07/10/21 07:14	1
Radium-228	0.326		0.124	0.128		0.0718	pCi/g	06/17/21 14:30	07/10/21 07:14	1
Thallium-208	0.0438		0.0504	0.0506		0.0272	pCi/g	06/17/21 14:30	07/10/21 07:14	1
Thorium 228	0.280		0.0551	0.0660		0.0228	pCi/g	06/17/21 14:30	07/10/21 07:14	1
Thorium-232	0.326		0.124	0.128		0.0718	pCi/g	06/17/21 14:30	07/10/21 07:14	1
Thorium-234	0.0000001	U	0.806	0.806		0.664	pCi/g	06/17/21 14:30	07/10/21 07:14	1

Client Sample Results

Client: Aptim Federal Services LLC
 Project/Site: HPNS-Parcel G 501197

Job ID: 160-42413-1
 SDG: GJ46599751

Client Sample ID: HPPG-SFU-TU-115A-013

Lab Sample ID: 160-42413-15

Date Collected: 06/11/21 10:54
 Date Received: 06/14/21 08:45

Matrix: Solid

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS) (Continued)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Uranium-235	0.0178	U	0.147	0.147		0.120	pCi/g	06/17/21 14:30	07/10/21 07:14	1
Uranium-238	0.000001	U	0.806	0.806		0.664	pCi/g	06/17/21 14:30	07/10/21 07:14	1

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Client Sample ID: HPPG-SFU-TU-115A-014

Lab Sample ID: 160-42413-16

Date Collected: 06/11/21 10:56
 Date Received: 06/14/21 08:45

Matrix: Solid

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Actinium-228	0.0984	U	0.0630	0.0638		0.137	pCi/g	06/17/21 14:30	07/10/21 07:16	1
Actinium-227	0.170	U	0.350	0.351		0.206	pCi/g	06/17/21 14:30	07/10/21 07:16	1
Americium-241	0.0568	U	0.141	0.141		0.114	pCi/g	06/17/21 14:30	07/10/21 07:16	1
Bismuth-212	-0.460	U	0.812	0.814		0.632	pCi/g	06/17/21 14:30	07/10/21 07:16	1
Bismuth-214	0.229		0.105	0.108		0.0470	pCi/g	06/17/21 14:30	07/10/21 07:16	1
Cesium-137	0.000	U	0.00895	0.00895	0.0700	0.0168	pCi/g	06/17/21 14:30	07/10/21 07:16	1
Lead-210	0.253	U	1.29	1.29		1.04	pCi/g	06/17/21 14:30	07/10/21 07:16	1
Lead-212	0.184		0.0713	0.0738		0.0442	pCi/g	06/17/21 14:30	07/10/21 07:16	1
Lead-214	0.242		0.0962	0.0993		0.0461	pCi/g	06/17/21 14:30	07/10/21 07:16	1
Potassium-40	5.79		1.07	1.22		0.253	pCi/g	06/17/21 14:30	07/10/21 07:16	1
Protactinium-231	0.000	U	0.509	0.509		1.62	pCi/g	06/17/21 14:30	07/10/21 07:16	1
Protactinium-234	0.0723	U	0.220	0.220		0.178	pCi/g	06/17/21 14:30	07/10/21 07:16	1
Radium-226	0.229		0.105	0.108	0.200	0.0470	pCi/g	06/17/21 14:30	07/10/21 07:16	1
Radium-228	0.0984	U	0.0630	0.0638		0.137	pCi/g	06/17/21 14:30	07/10/21 07:16	1
Thallium-208	0.0960		0.0543	0.0552		0.0244	pCi/g	06/17/21 14:30	07/10/21 07:16	1
Thorium 228	0.184		0.0713	0.0738		0.0442	pCi/g	06/17/21 14:30	07/10/21 07:16	1
Thorium-232	0.0984	U	0.0630	0.0638		0.137	pCi/g	06/17/21 14:30	07/10/21 07:16	1
Thorium-234	-0.888	U	0.609	0.617		0.757	pCi/g	06/17/21 14:30	07/10/21 07:16	1
Uranium-235	-0.0540	U	0.142	0.142		0.323	pCi/g	06/17/21 14:30	07/10/21 07:16	1
Uranium-238	-0.888	U	0.609	0.617		0.757	pCi/g	06/17/21 14:30	07/10/21 07:16	1

Client Sample ID: HPPG-SFU-TU-115A-015

Lab Sample ID: 160-42413-17

Date Collected: 06/11/21 11:04
 Date Received: 06/14/21 08:45

Matrix: Solid

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Actinium-228	0.343		0.208	0.211		0.0951	pCi/g	06/17/21 14:30	07/10/21 07:18	1
Actinium-227	0.0735	U	0.276	0.277		0.257	pCi/g	06/17/21 14:30	07/10/21 07:18	1
Americium-241	0.0504	U	0.113	0.113		0.0909	pCi/g	06/17/21 14:30	07/10/21 07:18	1
Bismuth-212	0.211	U	0.571	0.572		0.454	pCi/g	06/17/21 14:30	07/10/21 07:18	1
Bismuth-214	0.350		0.0919	0.0988		0.0320	pCi/g	06/17/21 14:30	07/10/21 07:18	1
Cesium-137	-0.0291	U	0.0467	0.0468	0.0700	0.0362	pCi/g	06/17/21 14:30	07/10/21 07:18	1
Lead-210	0.611		0.640	0.644		0.390	pCi/g	06/17/21 14:30	07/10/21 07:18	1
Lead-212	0.440		0.0719	0.0917		0.0322	pCi/g	06/17/21 14:30	07/10/21 07:18	1

Eurofins TestAmerica, St. Louis

Client Sample Results

Client: Aptim Federal Services LLC
 Project/Site: HPNS-Parcel G 501197

Job ID: 160-42413-1
 SDG: GJ46599751

Client Sample ID: HPPG-SFU-TU-115A-015

Lab Sample ID: 160-42413-17

Date Collected: 06/11/21 11:04
 Date Received: 06/14/21 08:45

Matrix: Solid

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS) (Continued)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Lead-214	0.260		0.100	0.104		0.0677	pCi/g	06/17/21 14:30	07/10/21 07:18	1
Potassium-40	5.89		0.871	1.06		0.0751	pCi/g	06/17/21 14:30	07/10/21 07:18	1
Protactinium-231	0.000	U	0.342	0.342		1.74	pCi/g	06/17/21 14:30	07/10/21 07:18	1
Protactinium-234	0.171		0.0829	0.0848		0.156	pCi/g	06/17/21 14:30	07/10/21 07:18	1
Radium-226	0.350		0.0919	0.0988	0.200	0.0320	pCi/g	06/17/21 14:30	07/10/21 07:18	1
Radium-228	0.343		0.208	0.211		0.0951	pCi/g	06/17/21 14:30	07/10/21 07:18	1
Thallium-208	0.0803		0.0600	0.0606		0.0260	pCi/g	06/17/21 14:30	07/10/21 07:18	1
Thorium 228	0.440		0.0719	0.0917		0.0322	pCi/g	06/17/21 14:30	07/10/21 07:18	1
Thorium-232	0.343		0.208	0.211		0.0951	pCi/g	06/17/21 14:30	07/10/21 07:18	1
Thorium-234	0.168	U	0.357	0.358		0.743	pCi/g	06/17/21 14:30	07/10/21 07:18	1
Uranium-235	-0.0108	U	0.0193	0.0193		0.294	pCi/g	06/17/21 14:30	07/10/21 07:18	1
Uranium-238	0.168	U	0.357	0.358		0.743	pCi/g	06/17/21 14:30	07/10/21 07:18	1

Client Sample ID: HPPG-SFU-TU-115A-016

Lab Sample ID: 160-42413-18

Date Collected: 06/11/21 11:12
 Date Received: 06/14/21 08:45

Matrix: Solid

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Actinium 228	0.630		0.213	0.225		0.0867	pCi/g	06/17/21 14:30	07/10/21 07:16	1
Actinium-227	0.154	U	0.422	0.423		0.338	pCi/g	06/17/21 14:30	07/10/21 07:16	1
Americium-241	-0.0511	U	0.185	0.186		0.151	pCi/g	06/17/21 14:30	07/10/21 07:16	1
Bismuth-212	0.476	U	0.895	0.897		0.696	pCi/g	06/17/21 14:30	07/10/21 07:16	1
Bismuth-214	0.404		0.135	0.142		0.0556	pCi/g	06/17/21 14:30	07/10/21 07:16	1
Cesium-137	0.0369	U	0.0661	0.0663	0.0700	0.0509	pCi/g	06/17/21 14:30	07/10/21 07:16	1
Lead-210	0.379	U	1.82	1.82		1.19	pCi/g	06/17/21 14:30	07/10/21 07:16	1
Lead-212	0.410		0.106	0.116		0.0614	pCi/g	06/17/21 14:30	07/10/21 07:16	1
Lead-214	0.509		0.135	0.147		0.0512	pCi/g	06/17/21 14:30	07/10/21 07:16	1
Potassium-40	6.67		1.27	1.48		0.314	pCi/g	06/17/21 14:30	07/10/21 07:16	1
Protactinium-231	0.641	U	1.91	1.91		2.09	pCi/g	06/17/21 14:30	07/10/21 07:16	1
Protactinium-234	-0.0974	U	0.311	0.311		0.253	pCi/g	06/17/21 14:30	07/10/21 07:16	1
Radium-226	0.404		0.135	0.142	0.200	0.0556	pCi/g	06/17/21 14:30	07/10/21 07:16	1
Radium-228	0.630		0.213	0.225		0.0867	pCi/g	06/17/21 14:30	07/10/21 07:16	1
Thallium-208	0.142		0.0558	0.0582		0.0225	pCi/g	06/17/21 14:30	07/10/21 07:16	1
Thorium 228	0.410		0.106	0.116		0.0614	pCi/g	06/17/21 14:30	07/10/21 07:16	1
Thorium-232	0.630		0.213	0.225		0.0867	pCi/g	06/17/21 14:30	07/10/21 07:16	1
Thorium-234	-0.0747	U	0.734	0.734		0.605	pCi/g	06/17/21 14:30	07/10/21 07:16	1
Uranium-235	-0.232	U	0.389	0.390		0.514	pCi/g	06/17/21 14:30	07/10/21 07:16	1
Uranium-238	-0.0747	U	0.734	0.734		0.605	pCi/g	06/17/21 14:30	07/10/21 07:16	1

Eurofins TestAmerica, St. Louis

Client Sample Results

Client: Aptim Federal Services LLC
 Project/Site: HPNS-Parcel G 501197

Job ID: 160-42413-1
 SDG: GJ46599751

Client Sample ID: HPPG-SFU-TU-115A-017

Lab Sample ID: 160-42413-19

Date Collected: 06/11/21 11:17
 Date Received: 06/14/21 08:45

Matrix: Solid

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			(2σ+/-)	(2σ+/-)						
Actinium 228	0.299		0.171	0.174		0.0722	pCi/g	06/17/21 14:30	07/10/21 07:17	1
Actinium-227	0.0490	U	0.100	0.101		0.304	pCi/g	06/17/21 14:30	07/10/21 07:17	1
Americium-241	-0.0391	U	0.106	0.107		0.0720	pCi/g	06/17/21 14:30	07/10/21 07:17	1
Bismuth-212	0.247	U	0.561	0.561		0.433	pCi/g	06/17/21 14:30	07/10/21 07:17	1
Bismuth-214	0.258		0.0940	0.0977		0.0351	pCi/g	06/17/21 14:30	07/10/21 07:17	1
Cesium-137	0.00107	U	0.0361	0.0361	0.0700	0.0295	pCi/g	06/17/21 14:30	07/10/21 07:17	1
Lead-210	0.483	U	0.873	0.874		0.611	pCi/g	06/17/21 14:30	07/10/21 07:17	1
Lead-212	0.351		0.0997	0.110		0.0634	pCi/g	06/17/21 14:30	07/10/21 07:17	1
Lead-214	0.274		0.0759	0.0811		0.0337	pCi/g	06/17/21 14:30	07/10/21 07:17	1
Potassium-40	5.45		1.07	1.21		0.240	pCi/g	06/17/21 14:30	07/10/21 07:17	1
Protactinium-231	0.537	U	1.72	1.72		1.39	pCi/g	06/17/21 14:30	07/10/21 07:17	1
Protactinium-234	0.146		0.0882	0.0895		0.112	pCi/g	06/17/21 14:30	07/10/21 07:17	1
Radium-226	0.258		0.0940	0.0977	0.200	0.0351	pCi/g	06/17/21 14:30	07/10/21 07:17	1
Radium-228	0.299		0.171	0.174		0.0722	pCi/g	06/17/21 14:30	07/10/21 07:17	1
Thallium-208	0.101		0.0388	0.0402		0.0120	pCi/g	06/17/21 14:30	07/10/21 07:17	1
Thorium 228	0.351		0.0997	0.110		0.0634	pCi/g	06/17/21 14:30	07/10/21 07:17	1
Thorium-232	0.299		0.171	0.174		0.0722	pCi/g	06/17/21 14:30	07/10/21 07:17	1
Thorium-234	-0.612	U	0.476	0.481		0.652	pCi/g	06/17/21 14:30	07/10/21 07:17	1
Uranium-235	0.101	U	0.224	0.224		0.174	pCi/g	06/17/21 14:30	07/10/21 07:17	1
Uranium-238	-0.612	U	0.476	0.481		0.652	pCi/g	06/17/21 14:30	07/10/21 07:17	1

Client Sample ID: HPPG-SFU-TU-115A-018

Lab Sample ID: 160-42413-20

Date Collected: 06/11/21 11:24
 Date Received: 06/14/21 08:45

Matrix: Solid

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			(2σ+/-)	(2σ+/-)						
Actinium 228	0.248		0.127	0.129		0.0555	pCi/g	06/17/21 14:30	07/10/21 07:19	1
Actinium-227	0.131	U	0.323	0.323		0.271	pCi/g	06/17/21 14:30	07/10/21 07:19	1
Americium-241	0.0217	U	0.155	0.155		0.126	pCi/g	06/17/21 14:30	07/10/21 07:19	1
Bismuth-212	-0.405	U	0.787	0.788		0.617	pCi/g	06/17/21 14:30	07/10/21 07:19	1
Bismuth-214	0.349		0.115	0.121		0.0493	pCi/g	06/17/21 14:30	07/10/21 07:19	1
Cesium-137	0.00395	U	0.0477	0.0477	0.0700	0.0389	pCi/g	06/17/21 14:30	07/10/21 07:19	1
Lead-210	-0.586	U	1.20	1.20		1.02	pCi/g	06/17/21 14:30	07/10/21 07:19	1
Lead-212	0.249		0.0687	0.0759		0.0351	pCi/g	06/17/21 14:30	07/10/21 07:19	1
Lead-214	0.345		0.0903	0.0971		0.0340	pCi/g	06/17/21 14:30	07/10/21 07:19	1
Potassium-40	4.80		0.970	1.09		0.269	pCi/g	06/17/21 14:30	07/10/21 07:19	1
Protactinium-231	-0.114	U	2.24	2.24		1.84	pCi/g	06/17/21 14:30	07/10/21 07:19	1
Protactinium-234	0.00386	U	0.00708	0.00709		0.232	pCi/g	06/17/21 14:30	07/10/21 07:19	1
Radium-226	0.349		0.115	0.121	0.200	0.0493	pCi/g	06/17/21 14:30	07/10/21 07:19	1
Radium-228	0.248		0.127	0.129		0.0555	pCi/g	06/17/21 14:30	07/10/21 07:19	1
Thallium-208	0.0403	U	0.0639	0.0640		0.0421	pCi/g	06/17/21 14:30	07/10/21 07:19	1
Thorium 228	0.249		0.0687	0.0759		0.0351	pCi/g	06/17/21 14:30	07/10/21 07:19	1
Thorium-232	0.248		0.127	0.129		0.0555	pCi/g	06/17/21 14:30	07/10/21 07:19	1
Thorium-234	0.466		0.519	0.522		0.386	pCi/g	06/17/21 14:30	07/10/21 07:19	1
Uranium-235	-0.202	U	0.317	0.317		0.456	pCi/g	06/17/21 14:30	07/10/21 07:19	1

Eurofins TestAmerica, St. Louis

Client Sample Results

Client: Aptim Federal Services LLC
 Project/Site: HPNS-Parcel G 501197

Job ID: 160-42413-1
 SDG: GJ46599751

Client Sample ID: HPPG-SFU-TU-115A-018

Lab Sample ID: 160-42413-20

Date Collected: 06/11/21 11:24

Matrix: Solid

Date Received: 06/14/21 08:45

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS) (Continued)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	(2σ+/-)						
Uranium-238	0.466		0.519	0.522		0.386	pCi/g	06/17/21 14:30	07/10/21 07:19	1

Client Sample ID: HPPG-SFU-TU-115A-019

Lab Sample ID: 160-42413-21

Date Collected: 06/11/21 11:27

Matrix: Solid

Date Received: 06/14/21 08:45

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	(2σ+/-)						
Actinium 228	0.302		0.175	0.177		0.0756	pCi/g	06/17/21 14:30	07/10/21 07:48	1
Actinium-227	0.116	U	0.255	0.256		0.233	pCi/g	06/17/21 14:30	07/10/21 07:48	1
Americium-241	-0.0376	U	0.0972	0.0973		0.0784	pCi/g	06/17/21 14:30	07/10/21 07:48	1
Bismuth-212	0.261	U	0.448	0.449		0.342	pCi/g	06/17/21 14:30	07/10/21 07:48	1
Bismuth-214	0.322		0.0968	0.102		0.0385	pCi/g	06/17/21 14:30	07/10/21 07:48	1
Cesium-137	0.0208		0.0382	0.0383	0.0700	0.0196	pCi/g	06/17/21 14:30	07/10/21 07:48	1
Lead-210	-0.598	U	1.12	1.13		0.898	pCi/g	06/17/21 14:30	07/10/21 07:48	1
Lead-212	0.320		0.0613	0.0739		0.0264	pCi/g	06/17/21 14:30	07/10/21 07:48	1
Lead-214	0.307		0.0713	0.0782		0.0321	pCi/g	06/17/21 14:30	07/10/21 07:48	1
Potassium-40	5.08		0.863	1.01		0.216	pCi/g	06/17/21 14:30	07/10/21 07:48	1
Protactinium-231	0.000	U	0.622	0.622		1.48	pCi/g	06/17/21 14:30	07/10/21 07:48	1
Protactinium-234	0.0631	U	0.132	0.132		0.146	pCi/g	06/17/21 14:30	07/10/21 07:48	1
Radium-226	0.322		0.0968	0.102	0.200	0.0385	pCi/g	06/17/21 14:30	07/10/21 07:48	1
Radium-228	0.302		0.175	0.177		0.0756	pCi/g	06/17/21 14:30	07/10/21 07:48	1
Thallium-208	0.0910		0.0594	0.0601		0.0246	pCi/g	06/17/21 14:30	07/10/21 07:48	1
Thorium 228	0.320		0.0613	0.0739		0.0264	pCi/g	06/17/21 14:30	07/10/21 07:48	1
Thorium-232	0.302		0.175	0.177		0.0756	pCi/g	06/17/21 14:30	07/10/21 07:48	1
Thorium-234	0.245	U	0.584	0.584		0.472	pCi/g	06/17/21 14:30	07/10/21 07:48	1
Uranium-235	0.0423	U	0.152	0.152		0.277	pCi/g	06/17/21 14:30	07/10/21 07:48	1
Uranium-238	0.245	U	0.584	0.584		0.472	pCi/g	06/17/21 14:30	07/10/21 07:48	1

Client Sample ID: HPPG-SFU-TU-115A-020

Lab Sample ID: 160-42413-22

Date Collected: 06/11/21 12:46

Matrix: Solid

Date Received: 06/14/21 08:45

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	(2σ+/-)						
Actinium 228	0.525		0.154	0.163		0.0615	pCi/g	06/17/21 14:30	07/10/21 07:49	1
Actinium-227	0.174	U	0.350	0.351		0.329	pCi/g	06/17/21 14:30	07/10/21 07:49	1
Americium-241	-0.00114	U	0.155	0.155		0.128	pCi/g	06/17/21 14:30	07/10/21 07:49	1
Bismuth-212	-0.0321	U	0.691	0.691		0.566	pCi/g	06/17/21 14:30	07/10/21 07:49	1
Bismuth-214	0.415		0.122	0.129		0.0518	pCi/g	06/17/21 14:30	07/10/21 07:49	1
Cesium-137	0.0165	U	0.0405	0.0406	0.0700	0.0312	pCi/g	06/17/21 14:30	07/10/21 07:49	1
Lead-210	0.209	U	1.67	1.67		1.36	pCi/g	06/17/21 14:30	07/10/21 07:49	1
Lead-212	0.478		0.140	0.148		0.0971	pCi/g	06/17/21 14:30	07/10/21 07:49	1
Lead-214	0.360		0.0910	0.0980		0.0401	pCi/g	06/17/21 14:30	07/10/21 07:49	1

Eurofins TestAmerica, St. Louis

Client Sample Results

Client: Aptim Federal Services LLC
Project/Site: HPNS-Parcel G 501197

Job ID: 160-42413-1
SDG: GJ46599751

Client Sample ID: HPPG-SFU-TU-115A-020

Lab Sample ID: 160-42413-22

Date Collected: 06/11/21 12:46
Date Received: 06/14/21 08:45

Matrix: Solid

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS) (Continued)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Potassium-40	5.82		1.08	1.23	0.255	pCi/g	06/17/21 14:30	07/10/21 07:49		1
Protactinium-231	-0.847	U	2.85	2.85	2.32	pCi/g	06/17/21 14:30	07/10/21 07:49		1
Protactinium-234	0.0785	U	0.258	0.259	0.210	pCi/g	06/17/21 14:30	07/10/21 07:49		1
Radium-226	0.415		0.122	0.129	0.200	pCi/g	06/17/21 14:30	07/10/21 07:49		1
Radium-228	0.525		0.154	0.163	0.0615	pCi/g	06/17/21 14:30	07/10/21 07:49		1
Thallium-208	0.173		0.0459	0.0491	0.00682	pCi/g	06/17/21 14:30	07/10/21 07:49		1
Thorium 228	0.478		0.140	0.148	0.0971	pCi/g	06/17/21 14:30	07/10/21 07:49		1
Thorium-232	0.525		0.154	0.163	0.0615	pCi/g	06/17/21 14:30	07/10/21 07:49		1
Thorium-234	-0.887	U	0.617	0.625	0.845	pCi/g	06/17/21 14:30	07/10/21 07:49		1
Uranium-235	0.000	U	0.185	0.185	0.372	pCi/g	06/17/21 14:30	07/10/21 07:49		1
Uranium-238	-0.887	U	0.617	0.625	0.845	pCi/g	06/17/21 14:30	07/10/21 07:49		1

Client Sample ID: HPPG-SFU-TU-115A-021

Lab Sample ID: 160-42413-23

Date Collected: 06/11/21 12:51
Date Received: 06/14/21 08:45

Method: 905 - Strontium-90 (GFPC)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Strontium-90	0.292		0.214	0.216	0.331	0.154	pCi/g	07/20/21 12:00	07/29/21 19:08	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Sr Carrier	79.4		40 - 110					07/20/21 12:00	07/29/21 19:08	1
Y Carrier	92.6		40 - 110					07/20/21 12:00	07/29/21 19:08	1

Method: A-01-R - Isotopic Plutonium and Neptunium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Plutonium-238	-0.0234	U	0.0204	0.0205	0.100	0.0204	pCi/g	06/24/21 15:36	07/11/21 12:50	1
Plutonium-239/240	0.00213	U	0.0128	0.0128	0.100	0.00992	pCi/g	06/24/21 15:36	07/11/21 12:50	1
Tracer	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Pu-242 (T)	81.6		30 - 110					06/24/21 15:36	07/11/21 12:50	1

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Thorium-228	0.0860		0.0730	0.0733	0.250	0.0501	pCi/g	06/24/21 17:12	07/08/21 22:12	1
Thorium-230	0.0974		0.0770	0.0774	0.250	0.0483	pCi/g	06/24/21 17:12	07/08/21 22:12	1
Thorium-232	0.268		0.0607	0.0647	0.250	0.0108	pCi/g	06/24/21 17:12	07/08/21 22:12	1
Tracer	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Thorium-229	53.0		30 - 110					06/24/21 17:12	07/08/21 22:12	1

Eurofins TestAmerica, St. Louis

Client Sample Results

Client: Aptim Federal Services LLC
 Project/Site: HPNS-Parcel G 501197

Job ID: 160-42413-1
 SDG: GJ46599751

Client Sample ID: HPPG-SFU-TU-115A-021

Lab Sample ID: 160-42413-23

Date Collected: 06/11/21 12:51
 Date Received: 06/14/21 08:45

Matrix: Solid

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			(2σ+/-)	(2σ+/-)						
Actinium 228	0.205		0.102	0.104		0.0329	pCi/g	06/17/21 14:30	07/10/21 07:51	1
Actinium-227	0.0651	U	0.328	0.328		0.192	pCi/g	06/17/21 14:30	07/10/21 07:51	1
Americium-241	-0.0411	U	0.0921	0.0922		0.0740	pCi/g	06/17/21 14:30	07/10/21 07:51	1
Bismuth-212	0.146	U	0.326	0.326		0.249	pCi/g	06/17/21 14:30	07/10/21 07:51	1
Bismuth-214	0.203		0.0622	0.0657		0.0255	pCi/g	06/17/21 14:30	07/10/21 07:51	1
Cesium-137	0.0113	U	0.0301	0.0301	0.0700	0.0156	pCi/g	06/17/21 14:30	07/10/21 07:51	1
Lead-210	0.327	U	0.855	0.856		0.686	pCi/g	06/17/21 14:30	07/10/21 07:51	1
Lead-212	0.238		0.0535	0.0618		0.0252	pCi/g	06/17/21 14:30	07/10/21 07:51	1
Lead-214	0.216		0.0764	0.0797		0.0328	pCi/g	06/17/21 14:30	07/10/21 07:51	1
Potassium-40	4.83		0.778	0.922		0.0731	pCi/g	06/17/21 14:30	07/10/21 07:51	1
Protactinium-231	-0.639	U	1.99	2.00		1.62	pCi/g	06/17/21 14:30	07/10/21 07:51	1
Protactinium-234	-0.0677	U	0.180	0.180		0.146	pCi/g	06/17/21 14:30	07/10/21 07:51	1
Radium-226	0.203		0.0622	0.0657	0.200	0.0255	pCi/g	06/17/21 14:30	07/10/21 07:51	1
Radium-228	0.205		0.102	0.104		0.0329	pCi/g	06/17/21 14:30	07/10/21 07:51	1
Thallium-208	0.0211		0.0445	0.0445		0.0188	pCi/g	06/17/21 14:30	07/10/21 07:51	1
Thorium 228	0.238		0.0535	0.0618		0.0252	pCi/g	06/17/21 14:30	07/10/21 07:51	1
Thorium-232	0.205		0.102	0.104		0.0329	pCi/g	06/17/21 14:30	07/10/21 07:51	1
Thorium-234	0.000	U	0.267	0.267		0.533	pCi/g	06/17/21 14:30	07/10/21 07:51	1
Uranium-235	-0.0120	U	0.0265	0.0265		0.284	pCi/g	06/17/21 14:30	07/10/21 07:51	1
Uranium-238	0.000	U	0.267	0.267		0.533	pCi/g	06/17/21 14:30	07/10/21 07:51	1

Client Sample ID: HPPG-SFU-TU-115A-022

Lab Sample ID: 160-42413-24

Date Collected: 06/11/21 12:55
 Date Received: 06/14/21 08:45

Matrix: Solid

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			(2σ+/-)	(2σ+/-)						
Actinium 228	0.374		0.193	0.198		0.147	pCi/g	06/17/21 14:30	07/10/21 07:50	1
Actinium-227	0.0645	U	0.137	0.137		0.371	pCi/g	06/17/21 14:30	07/10/21 07:50	1
Americium-241	0.00734	U	0.117	0.117		0.0764	pCi/g	06/17/21 14:30	07/10/21 07:50	1
Bismuth-212	0.330	U	0.603	0.604		0.454	pCi/g	06/17/21 14:30	07/10/21 07:50	1
Bismuth-214	0.375		0.124	0.132		0.0488	pCi/g	06/17/21 14:30	07/10/21 07:50	1
Cesium-137	0.00369	U	0.0462	0.0462	0.0700	0.0375	pCi/g	06/17/21 14:30	07/10/21 07:50	1
Lead-210	-2.43	U	1.59	1.63		1.80	pCi/g	06/17/21 14:30	07/10/21 07:50	1
Lead-212	0.321		0.0874	0.0952		0.0477	pCi/g	06/17/21 14:30	07/10/21 07:50	1
Lead-214	0.357		0.0990	0.107		0.0473	pCi/g	06/17/21 14:30	07/10/21 07:50	1
Potassium-40	5.69		1.17	1.34		0.308	pCi/g	06/17/21 14:30	07/10/21 07:50	1
Protactinium-231	0.574	U	1.36	1.36		1.50	pCi/g	06/17/21 14:30	07/10/21 07:50	1
Protactinium-234	0.0430	U	0.0344	0.0347		0.251	pCi/g	06/17/21 14:30	07/10/21 07:50	1
Radium-226	0.375		0.124	0.132	0.200	0.0488	pCi/g	06/17/21 14:30	07/10/21 07:50	1
Radium-228	0.374		0.193	0.198		0.147	pCi/g	06/17/21 14:30	07/10/21 07:50	1
Thallium-208	0.0650		0.0738	0.0742		0.0401	pCi/g	06/17/21 14:30	07/10/21 07:50	1
Thorium 228	0.321		0.0874	0.0952		0.0477	pCi/g	06/17/21 14:30	07/10/21 07:50	1
Thorium-232	0.374		0.193	0.198		0.147	pCi/g	06/17/21 14:30	07/10/21 07:50	1
Thorium-234	-0.149	U	0.665	0.665		0.552	pCi/g	06/17/21 14:30	07/10/21 07:50	1
Uranium-235	-0.0149	U	0.353	0.353		0.434	pCi/g	06/17/21 14:30	07/10/21 07:50	1

Eurofins TestAmerica, St. Louis

Client Sample Results

Client: Aptim Federal Services LLC
 Project/Site: HPNS-Parcel G 501197

Job ID: 160-42413-1
 SDG: GJ46599751

Client Sample ID: HPPG-SFU-TU-115A-022

Lab Sample ID: 160-42413-24

Date Collected: 06/11/21 12:55
 Date Received: 06/14/21 08:45

Matrix: Solid

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS) (Continued)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Uranium-238	-0.149	U	0.665	0.665		0.552	pCi/g	06/17/21 14:30	07/10/21 07:50	1

Client Sample ID: HPPG-SFU-TU-115A-023

Lab Sample ID: 160-42413-25

Date Collected: 06/11/21 13:01
 Date Received: 06/14/21 08:45

Matrix: Solid

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Actinium 228	0.518		0.171	0.179		0.0401	pCi/g	06/17/21 14:30	07/10/21 07:52	1
Actinium-227	-0.269	U	0.542	0.543		0.342	pCi/g	06/17/21 14:30	07/10/21 07:52	1
Americium-241	0.000	U	0.0747	0.0747		0.0760	pCi/g	06/17/21 14:30	07/10/21 07:52	1
Bismuth-212	0.284	U	0.505	0.506		0.376	pCi/g	06/17/21 14:30	07/10/21 07:52	1
Bismuth-214	0.222		0.108	0.110		0.177	pCi/g	06/17/21 14:30	07/10/21 07:52	1
Cesium-137	0.0353	U	0.0709	0.0710	0.0700	0.0556	pCi/g	06/17/21 14:30	07/10/21 07:52	1
Lead-210	0.674		0.964	0.967		0.645	pCi/g	06/17/21 14:30	07/10/21 07:52	1
Lead-212	0.317		0.0798	0.0898		0.0414	pCi/g	06/17/21 14:30	07/10/21 07:52	1
Lead-214	0.399		0.107	0.115		0.0407	pCi/g	06/17/21 14:30	07/10/21 07:52	1
Potassium-40	6.73		1.22	1.40		0.254	pCi/g	06/17/21 14:30	07/10/21 07:52	1
Protactinium-231	0.454	U	1.34	1.34		1.46	pCi/g	06/17/21 14:30	07/10/21 07:52	1
Protactinium-234	0.0651	U	0.173	0.173		0.140	pCi/g	06/17/21 14:30	07/10/21 07:52	1
Radium-226	0.222		0.108	0.110	0.200	0.177	pCi/g	06/17/21 14:30	07/10/21 07:52	1
Radium-228	0.518		0.171	0.179		0.0401	pCi/g	06/17/21 14:30	07/10/21 07:52	1
Thallium-208	0.186		0.0666	0.0694		0.0247	pCi/g	06/17/21 14:30	07/10/21 07:52	1
Thorium 228	0.317		0.0798	0.0898		0.0414	pCi/g	06/17/21 14:30	07/10/21 07:52	1
Thorium-232	0.518		0.171	0.179		0.0401	pCi/g	06/17/21 14:30	07/10/21 07:52	1
Thorium-234	-0.165	U	0.447	0.447		0.375	pCi/g	06/17/21 14:30	07/10/21 07:52	1
Uranium-235	0.0223	U	0.132	0.132		0.232	pCi/g	06/17/21 14:30	07/10/21 07:52	1
Uranium-238	-0.165	U	0.447	0.447		0.375	pCi/g	06/17/21 14:30	07/10/21 07:52	1

Client Sample ID: HPPG-SFU-TU-115A-024

Lab Sample ID: 160-42413-26

Date Collected: 06/11/21 13:09
 Date Received: 06/14/21 08:45

Matrix: Solid

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Actinium 228	0.332		0.125	0.129		0.0793	pCi/g	06/17/21 14:30	07/10/21 07:54	1
Actinium-227	-0.297	U	0.595	0.596		0.359	pCi/g	06/17/21 14:30	07/10/21 07:54	1
Americium-241	-0.0133	U	0.138	0.138		0.114	pCi/g	06/17/21 14:30	07/10/21 07:54	1
Bismuth-212	0.316	U	0.522	0.523		0.392	pCi/g	06/17/21 14:30	07/10/21 07:54	1
Bismuth-214	0.319		0.105	0.110		0.0399	pCi/g	06/17/21 14:30	07/10/21 07:54	1
Cesium-137	-0.0214	U	0.0576	0.0576	0.0700	0.0456	pCi/g	06/17/21 14:30	07/10/21 07:54	1
Lead-210	-0.621	U	1.25	1.25		1.05	pCi/g	06/17/21 14:30	07/10/21 07:54	1
Lead-212	0.251		0.0755	0.0822		0.0432	pCi/g	06/17/21 14:30	07/10/21 07:54	1
Lead-214	0.243		0.0904	0.0938		0.0746	pCi/g	06/17/21 14:30	07/10/21 07:54	1

Eurofins TestAmerica, St. Louis

Client Sample Results

Client: Aptim Federal Services LLC
 Project/Site: HPNS-Parcel G 501197

Job ID: 160-42413-1
 SDG: GJ46599751

Client Sample ID: HPPG-SFU-TU-115A-024

Lab Sample ID: 160-42413-26

Date Collected: 06/11/21 13:09
 Date Received: 06/14/21 08:45

Matrix: Solid

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS) (Continued)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			(2σ+/-)	(2σ+/-)						
Potassium-40	5.06		0.997	1.12		0.271	pCi/g	06/17/21 14:30	07/10/21 07:54	1
Protactinium-231	0.000	U	0.570	0.570		1.85	pCi/g	06/17/21 14:30	07/10/21 07:54	1
Protactinium-234	0.0136	U	0.0223	0.0224		0.211	pCi/g	06/17/21 14:30	07/10/21 07:54	1
Radium-226	0.319		0.105	0.110	0.200	0.0399	pCi/g	06/17/21 14:30	07/10/21 07:54	1
Radium-228	0.332		0.125	0.129		0.0793	pCi/g	06/17/21 14:30	07/10/21 07:54	1
Thallium-208	0.0950		0.0483	0.0493		0.0381	pCi/g	06/17/21 14:30	07/10/21 07:54	1
Thorium 228	0.251		0.0755	0.0822		0.0432	pCi/g	06/17/21 14:30	07/10/21 07:54	1
Thorium-232	0.332		0.125	0.129		0.0793	pCi/g	06/17/21 14:30	07/10/21 07:54	1
Thorium-234	0.228	U	0.406	0.407		0.372	pCi/g	06/17/21 14:30	07/10/21 07:54	1
Uranium-235	0.129	U	0.368	0.368		0.357	pCi/g	06/17/21 14:30	07/10/21 07:54	1
Uranium-238	0.228	U	0.406	0.407		0.372	pCi/g	06/17/21 14:30	07/10/21 07:54	1

Client Sample ID: HPPG-SFU-TU-115A-025

Lab Sample ID: 160-42413-27

Date Collected: 06/11/21 13:12
 Date Received: 06/14/21 08:45

Matrix: Solid

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			(2σ+/-)	(2σ+/-)						
Actinium 228	0.277		0.130	0.133		0.0451	pCi/g	06/17/21 14:30	07/10/21 08:32	1
Actinium-227	-0.114	U	0.426	0.426		0.249	pCi/g	06/17/21 14:30	07/10/21 08:32	1
Americium-241	0.0456	U	0.0997	0.0998		0.0800	pCi/g	06/17/21 14:30	07/10/21 08:32	1
Bismuth-212	0.0373	U	0.442	0.442		0.361	pCi/g	06/17/21 14:30	07/10/21 08:32	1
Bismuth-214	0.270		0.0793	0.0841		0.0277	pCi/g	06/17/21 14:30	07/10/21 08:32	1
Cesium-137	0.00192	U	0.0410	0.0410	0.0700	0.0336	pCi/g	06/17/21 14:30	07/10/21 08:32	1
Lead-210	0.0650	U	1.01	1.01		0.825	pCi/g	06/17/21 14:30	07/10/21 08:32	1
Lead-212	0.258		0.0598	0.0685		0.0297	pCi/g	06/17/21 14:30	07/10/21 08:32	1
Lead-214	0.233		0.0624	0.0669		0.0298	pCi/g	06/17/21 14:30	07/10/21 08:32	1
Potassium-40	6.23		0.964	1.16		0.223	pCi/g	06/17/21 14:30	07/10/21 08:32	1
Protactinium-231	0.000	U	0.220	0.220		1.44	pCi/g	06/17/21 14:30	07/10/21 08:32	1
Protactinium-234	-0.0765	U	0.213	0.214		0.174	pCi/g	06/17/21 14:30	07/10/21 08:32	1
Radium-226	0.270		0.0793	0.0841	0.200	0.0277	pCi/g	06/17/21 14:30	07/10/21 08:32	1
Radium-228	0.277		0.130	0.133		0.0451	pCi/g	06/17/21 14:30	07/10/21 08:32	1
Thallium-208	0.106		0.0375	0.0391		0.0147	pCi/g	06/17/21 14:30	07/10/21 08:32	1
Thorium 228	0.258		0.0598	0.0685		0.0297	pCi/g	06/17/21 14:30	07/10/21 08:32	1
Thorium-232	0.277		0.130	0.133		0.0451	pCi/g	06/17/21 14:30	07/10/21 08:32	1
Thorium-234	-0.249	U	0.817	0.817		0.667	pCi/g	06/17/21 14:30	07/10/21 08:32	1
Uranium-235	0.000	U	0.108	0.108		0.329	pCi/g	06/17/21 14:30	07/10/21 08:32	1
Uranium-238	-0.249	U	0.817	0.817		0.667	pCi/g	06/17/21 14:30	07/10/21 08:32	1

Eurofins TestAmerica, St. Louis

QC Sample Results

Client: Aptim Federal Services LLC
Project/Site: HPNS-Parcel G 501197

Job ID: 160-42413-1
SDG: GJ46599751

Method: 905 - Strontium-90 (GFPC)

Lab Sample ID: MB 160-519394/23-A

Matrix: Solid

Analysis Batch: 520677

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 519394

Analyte	MB		Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)		LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
	Result	MB Qualifier		(2σ+/-)	(2σ+/-)						
Strontium-90	0.04134	U	0.0605	0.0606	0.331	0.0468	pCi/g	07/20/21 12:00	07/29/21 19:09	1	
<hr/>											
Carrier	MB		%Yield	MB Qualifier	Limits		Prepared	Analyzed	Dil Fac		
	Sr Carrier	84.0			40 - 110						
Y Carrier	92.6				40 - 110		07/20/21 12:00	07/29/21 19:09	1		

Lab Sample ID: LCS 160-519394/1-A

Matrix: Solid

Analysis Batch: 520677

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 519394

Analyte	MB		Spike Added	LCS		Total Uncert. (2σ+/-)	LOQ	DLC	Unit	%Rec	%Rec. Limits
	Result	MB Qualifier		Result	LCS Qual						
Strontium-90	2.44			2.352		0.252	0.331	0.0451	pCi/g	96	75 - 125
<hr/>											
Carrier	LCS		%Yield	LCS Qualifier	Limits		Prepared	Analyzed	Dil Fac		
	Sr Carrier	85.3			40 - 110						
Y Carrier	92.3				40 - 110						

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Lab Sample ID: MB 160-515918/1-A

Matrix: Solid

Analysis Batch: 517637

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 515918

Analyte	MB		Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)		LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
	Result	MB Qualifier		(2σ+/-)	(2σ+/-)						
Thorium-228	0.05797		0.0471	0.0473	0.250	0.0311	pCi/g	06/24/21 17:12	07/08/21 22:12	1	
Thorium-230	-0.0001991	U	0.0417	0.0417	0.250	0.0256	pCi/g	06/24/21 17:12	07/08/21 22:12	1	
Thorium-232	0.1117		0.0343	0.0356	0.250	0.0122	pCi/g	06/24/21 17:12	07/08/21 22:12	1	
Tracer	MB		%Yield	MB Qualifier	Limits		Prepared	Analyzed	Dil Fac		
	Thorium-229	85.4			30 - 110						

Lab Sample ID: LCS 160-515918/2-A

Matrix: Solid

Analysis Batch: 517638

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 515918

Analyte	MB		Spike Added	LCS		Total Uncert. (2σ+/-)	LOQ	DLC	Unit	%Rec	%Rec. Limits
	Result	MB Qualifier		Result	LCS Qual						
Thorium-230	24.5		22.77			2.00	0.250	0.0406	pCi/g	93	81 - 118
<hr/>											
Tracer	LCS		%Yield	LCS Qualifier	Limits		Prepared	Analyzed	Dil Fac		
	Thorium-229	89.2			30 - 110						

Eurofins TestAmerica, St. Louis

QC Sample Results

Client: Aptim Federal Services LLC
Project/Site: HPNS-Parcel G 501197

Job ID: 160-42413-1
SDG: GJ46599751

Method: A-01-R - Isotopic Plutonium and Neptunium (Alpha Spectrometry)

Lab Sample ID: MB 160-515911/1-A

Matrix: Solid

Analysis Batch: 518094

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 515911

Analyte	Result	MB	MB	Count	Total	DLC	Unit	Prepared	Analyzed	Dil Fac
				Uncert. (2σ+/-)	Uncert. (2σ+/-)					
Plutonium-238	-0.02124	U		0.0300	0.0301	0.100	pCi/g	06/24/21 15:36	07/11/21 12:50	1
Plutonium-239/240	-0.02551	U		0.0190	0.0191	0.100	pCi/g	06/24/21 15:36	07/11/21 12:50	1
Tracer		MB	MB							
Pu-242 (T)	84.5	%Yield	Qualifier	Limits						
		30 - 110								

Lab Sample ID: LCS 160-515911/2-A

Matrix: Solid

Analysis Batch: 518095

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 515911

Analyte	Spike Added	LCS Result	LCS Qual	Count	Total	DLC	Unit	%Rec	%Rec. Limits	Dil Fac
				Uncert. (2σ+/-)	Uncert. (2σ+/-)					
Plutonium-238	2.60	2.781		0.278	0.100	0.0258	pCi/g	107	80 - 125	
Plutonium-239/2	2.64	2.671		0.268	0.100	0.0158	pCi/g	101	81 - 125	
40										
Tracer		LCS	LCS							
Pu-242 (T)	87.8	%Yield	Qualifier	Limits						
		30 - 110								

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Lab Sample ID: MB 160-514709/1-A

Matrix: Solid

Analysis Batch: 517773

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 514709

Analyte	Result	MB	MB	Count	Total	DLC	Unit	Prepared	Analyzed	Dil Fac
				Uncert. (2σ+/-)	Uncert. (2σ+/-)					
Actinium 228	0.0000	U		0.0251	0.0251	0.0292	pCi/g	06/17/21 13:33	07/09/21 14:16	1
Actinium-227	0.04141	U		0.367	0.367	0.216	pCi/g	06/17/21 13:33	07/09/21 14:16	1
Americium-241	-0.005235	U		0.0874	0.0874	0.0716	pCi/g	06/17/21 13:33	07/09/21 14:16	1
Bismuth-212	0.3190	U		0.651	0.652	0.503	pCi/g	06/17/21 13:33	07/09/21 14:16	1
Bismuth-214	-0.02067	U		0.115	0.115	0.0958	pCi/g	06/17/21 13:33	07/09/21 14:16	1
Cesium-137	0.0000	U		0.0134	0.0134	0.0340	pCi/g	06/17/21 13:33	07/09/21 14:16	1
Lead-210	0.1491	U		0.793	0.793	0.638	pCi/g	06/17/21 13:33	07/09/21 14:16	1
Lead-212	-0.04136	U		0.0922	0.0924	0.0736	pCi/g	06/17/21 13:33	07/09/21 14:16	1
Lead-214	0.01237	U		0.0888	0.0888	0.0663	pCi/g	06/17/21 13:33	07/09/21 14:16	1
Potassium-40	-0.04049	U		0.392	0.392	0.323	pCi/g	06/17/21 13:33	07/09/21 14:16	1
Protactinium-231	0.4031	U		1.19	1.19	1.28	pCi/g	06/17/21 13:33	07/09/21 14:16	1
Protactinium-234	-0.06831	U		0.197	0.197	0.159	pCi/g	06/17/21 13:33	07/09/21 14:16	1
Radium-226	-0.02067	U		0.115	0.115	0.0958	pCi/g	06/17/21 13:33	07/09/21 14:16	1
Radium-228	0.0000	U		0.0251	0.0251	0.0292	pCi/g	06/17/21 13:33	07/09/21 14:16	1
Thallium-208	0.01374	U		0.0207	0.0208	0.0368	pCi/g	06/17/21 13:33	07/09/21 14:16	1
Thorium 228	-0.04136	U		0.0922	0.0924	0.0736	pCi/g	06/17/21 13:33	07/09/21 14:16	1
Thorium-232	0.0000	U		0.0251	0.0251	0.0292	pCi/g	06/17/21 13:33	07/09/21 14:16	1
Thorium-234	-0.02985	U		0.626	0.626	0.514	pCi/g	06/17/21 13:33	07/09/21 14:16	1
Uranium-235	0.0000	U		0.135	0.135	0.295	pCi/g	06/17/21 13:33	07/09/21 14:16	1
Uranium-238	-0.02985	U		0.626	0.626	0.514	pCi/g	06/17/21 13:33	07/09/21 14:16	1

Eurofins TestAmerica, St. Louis

QC Sample Results

Client: Aptim Federal Services LLC
Project/Site: HPNS-Parcel G 501197

Job ID: 160-42413-1
SDG: GJ46599751

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS) (Continued)

Lab Sample ID: LCS 160-514709/2-A

Matrix: Solid

Analysis Batch: 517775

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 514709

Analyte	Spike Added	LCS		Total Uncert. (2σ+/-)	LOQ	DLC	Unit	%Rec	%Rec. Limits
		Result	Qual						
Americium-241	96.3	95.38		11.2		0.559	pCi/g	99	87 - 116
Cesium-137	26.4	29.07		3.06	0.0700	0.143	pCi/g	110	87 - 120
Cobalt-60	8.78	9.377		0.994		0.0712	pCi/g	107	87 - 115

Lab Sample ID: MB 160-514714/1-A

Matrix: Solid

Analysis Batch: 517996

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 514714

Analyte	MB Result	MB Qualifier	Count		Total Uncert. (2σ+/-)	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	(2σ+/-)							
Actinium 228	-0.007820	U	0.237	0.237			0.0546	pCi/g	06/17/21 14:30	07/10/21 08:36	1
Actinium-227	0.1297	U	0.324	0.324			0.306	pCi/g	06/17/21 14:30	07/10/21 08:36	1
Americium-241	-0.04867	U	0.104	0.104			0.0777	pCi/g	06/17/21 14:30	07/10/21 08:36	1
Bismuth-212	-0.3937	U	1.39	1.39			0.747	pCi/g	06/17/21 14:30	07/10/21 08:36	1
Bismuth-214	0.008074	U	0.181	0.181			0.147	pCi/g	06/17/21 14:30	07/10/21 08:36	1
Cesium-137	-0.02373	U	0.111	0.112	0.0700		0.0649	pCi/g	06/17/21 14:30	07/10/21 08:36	1
Lead-210	0.2019	U	1.16	1.16			0.837	pCi/g	06/17/21 14:30	07/10/21 08:36	1
Lead-212	0.01368	U	0.132	0.132			0.108	pCi/g	06/17/21 14:30	07/10/21 08:36	1
Lead-214	0.01155	U	0.0668	0.0668			0.105	pCi/g	06/17/21 14:30	07/10/21 08:36	1
Potassium-40	-0.2675	U	0.720	0.720			0.371	pCi/g	06/17/21 14:30	07/10/21 08:36	1
Protactinium-231	0.0000	U	0.921	0.921			1.87	pCi/g	06/17/21 14:30	07/10/21 08:36	1
Protactinium-234	0.05503	U	0.142	0.142			0.111	pCi/g	06/17/21 14:30	07/10/21 08:36	1
Radium-226	0.008074	U	0.181	0.181	0.200		0.147	pCi/g	06/17/21 14:30	07/10/21 08:36	1
Radium-228	-0.007820	U	0.237	0.237			0.0546	pCi/g	06/17/21 14:30	07/10/21 08:36	1
Thallium-208	-0.03729	U	0.0527	0.0528			0.0587	pCi/g	06/17/21 14:30	07/10/21 08:36	1
Thorium 228	0.01368	U	0.132	0.132			0.108	pCi/g	06/17/21 14:30	07/10/21 08:36	1
Thorium-232	-0.007820	U	0.237	0.237			0.0546	pCi/g	06/17/21 14:30	07/10/21 08:36	1
Thorium-234	0.2755	U	0.483	0.484			0.363	pCi/g	06/17/21 14:30	07/10/21 08:36	1
Uranium-235	-0.001853	U	0.00269	0.00270			0.225	pCi/g	06/17/21 14:30	07/10/21 08:36	1
Uranium-238	0.2755	U	0.483	0.484			0.363	pCi/g	06/17/21 14:30	07/10/21 08:36	1

Lab Sample ID: LCS 160-514714/2-A

Matrix: Solid

Analysis Batch: 517992

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 514714

Analyte	Spike Added	LCS		Total Uncert. (2σ+/-)	LOQ	DLC	Unit	%Rec	%Rec. Limits
		Result	Qual						
Americium-241	96.3	96.32		10.1		0.553	pCi/g	100	87 - 116
Cesium-137	26.4	26.71		2.86	0.0700	0.102	pCi/g	101	87 - 120
Cobalt-60	8.78	8.391		0.895		0.0306	pCi/g	96	87 - 115

Eurofins TestAmerica, St. Louis

QC Association Summary

Client: Aptim Federal Services LLC
Project/Site: HPNS-Parcel G 501197

Job ID: 160-42413-1
SDG: GJ46599751

Rad

Leach Batch: 514297

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-42413-16	HPPG-SFU-TU-115A-014	Total/NA	Solid	Dry and Grind	
160-42413-20	HPPG-SFU-TU-115A-018	Total/NA	Solid	Dry and Grind	

Leach Batch: 514313

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-42413-2	HPPG-F-076	Total/NA	Solid	Dry and Grind	
160-42413-3	HPPG-SFU-TU-115A-001	Total/NA	Solid	Dry and Grind	
160-42413-5	HPPG-SFU-TU-115A-003	Total/NA	Solid	Dry and Grind	
160-42413-7	HPPG-SFU-TU-115A-005	Total/NA	Solid	Dry and Grind	
160-42413-13	HPPG-SFU-TU-115A-011	Total/NA	Solid	Dry and Grind	
160-42413-18	HPPG-SFU-TU-115A-016	Total/NA	Solid	Dry and Grind	
160-42413-27	HPPG-SFU-TU-115A-025	Total/NA	Solid	Dry and Grind	

Leach Batch: 514362

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-42413-1	HPPG-F-075	Total/NA	Solid	Dry and Grind	
160-42413-4	HPPG-SFU-TU-115A-002	Total/NA	Solid	Dry and Grind	
160-42413-6	HPPG-SFU-TU-115A-004	Total/NA	Solid	Dry and Grind	
160-42413-8	HPPG-SFU-TU-115A-006	Total/NA	Solid	Dry and Grind	
160-42413-9	HPPG-SFU-TU-115A-007	Total/NA	Solid	Dry and Grind	
160-42413-10	HPPG-SFU-TU-115A-008	Total/NA	Solid	Dry and Grind	
160-42413-11	HPPG-SFU-TU-115A-009	Total/NA	Solid	Dry and Grind	
160-42413-12	HPPG-SFU-TU-115A-010	Total/NA	Solid	Dry and Grind	
160-42413-14	HPPG-SFU-TU-115A-012	Total/NA	Solid	Dry and Grind	
160-42413-15	HPPG-SFU-TU-115A-013	Total/NA	Solid	Dry and Grind	
160-42413-17	HPPG-SFU-TU-115A-015	Total/NA	Solid	Dry and Grind	
160-42413-19	HPPG-SFU-TU-115A-017	Total/NA	Solid	Dry and Grind	
160-42413-21	HPPG-SFU-TU-115A-019	Total/NA	Solid	Dry and Grind	
160-42413-22	HPPG-SFU-TU-115A-020	Total/NA	Solid	Dry and Grind	
160-42413-23	HPPG-SFU-TU-115A-021	Total/NA	Solid	Dry and Grind	
160-42413-24	HPPG-SFU-TU-115A-022	Total/NA	Solid	Dry and Grind	
160-42413-25	HPPG-SFU-TU-115A-023	Total/NA	Solid	Dry and Grind	
160-42413-26	HPPG-SFU-TU-115A-024	Total/NA	Solid	Dry and Grind	

Prep Batch: 514709

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-42413-1	HPPG-F-075	Total/NA	Solid	Fill_Geo-21	514362
160-42413-2	HPPG-F-076	Total/NA	Solid	Fill_Geo-21	514313
160-42413-3	HPPG-SFU-TU-115A-001	Total/NA	Solid	Fill_Geo-21	514313
160-42413-4	HPPG-SFU-TU-115A-002	Total/NA	Solid	Fill_Geo-21	514362
160-42413-5	HPPG-SFU-TU-115A-003	Total/NA	Solid	Fill_Geo-21	514313
160-42413-6	HPPG-SFU-TU-115A-004	Total/NA	Solid	Fill_Geo-21	514362
160-42413-7	HPPG-SFU-TU-115A-005	Total/NA	Solid	Fill_Geo-21	514313
160-42413-8	HPPG-SFU-TU-115A-006	Total/NA	Solid	Fill_Geo-21	514362
160-42413-9	HPPG-SFU-TU-115A-007	Total/NA	Solid	Fill_Geo-21	514362
160-42413-10	HPPG-SFU-TU-115A-008	Total/NA	Solid	Fill_Geo-21	514362
160-42413-11	HPPG-SFU-TU-115A-009	Total/NA	Solid	Fill_Geo-21	514362
MB 160-514709/1-A	Method Blank	Total/NA	Solid	Fill_Geo-21	
LCS 160-514709/2-A	Lab Control Sample	Total/NA	Solid	Fill_Geo-21	

Eurofins TestAmerica, St. Louis

QC Association Summary

Client: Aptim Federal Services LLC
Project/Site: HPNS-Parcel G 501197

Job ID: 160-42413-1
SDG: GJ46599751

Rad

Prep Batch: 514714

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-42413-12	HPPG-SFU-TU-115A-010	Total/NA	Solid	Fill_Geo-21	514362
160-42413-13	HPPG-SFU-TU-115A-011	Total/NA	Solid	Fill_Geo-21	514313
160-42413-14	HPPG-SFU-TU-115A-012	Total/NA	Solid	Fill_Geo-21	514362
160-42413-15	HPPG-SFU-TU-115A-013	Total/NA	Solid	Fill_Geo-21	514362
160-42413-16	HPPG-SFU-TU-115A-014	Total/NA	Solid	Fill_Geo-21	514297
160-42413-17	HPPG-SFU-TU-115A-015	Total/NA	Solid	Fill_Geo-21	514362
160-42413-18	HPPG-SFU-TU-115A-016	Total/NA	Solid	Fill_Geo-21	514313
160-42413-19	HPPG-SFU-TU-115A-017	Total/NA	Solid	Fill_Geo-21	514362
160-42413-20	HPPG-SFU-TU-115A-018	Total/NA	Solid	Fill_Geo-21	514297
160-42413-21	HPPG-SFU-TU-115A-019	Total/NA	Solid	Fill_Geo-21	514362
160-42413-22	HPPG-SFU-TU-115A-020	Total/NA	Solid	Fill_Geo-21	514362
160-42413-23	HPPG-SFU-TU-115A-021	Total/NA	Solid	Fill_Geo-21	514362
160-42413-24	HPPG-SFU-TU-115A-022	Total/NA	Solid	Fill_Geo-21	514362
160-42413-25	HPPG-SFU-TU-115A-023	Total/NA	Solid	Fill_Geo-21	514362
160-42413-26	HPPG-SFU-TU-115A-024	Total/NA	Solid	Fill_Geo-21	514362
160-42413-27	HPPG-SFU-TU-115A-025	Total/NA	Solid	Fill_Geo-21	514313
MB 160-514714/1-A	Method Blank	Total/NA	Solid	Fill_Geo-21	
LCS 160-514714/2-A	Lab Control Sample	Total/NA	Solid	Fill_Geo-21	

Prep Batch: 515911

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-42413-3	HPPG-SFU-TU-115A-001	Total/NA	Solid	ExtChrom	514313
160-42413-13	HPPG-SFU-TU-115A-011	Total/NA	Solid	ExtChrom	514313
160-42413-23	HPPG-SFU-TU-115A-021	Total/NA	Solid	ExtChrom	514362
MB 160-515911/1-A	Method Blank	Total/NA	Solid	ExtChrom	
LCS 160-515911/2-A	Lab Control Sample	Total/NA	Solid	ExtChrom	

Prep Batch: 515918

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-42413-3	HPPG-SFU-TU-115A-001	Total/NA	Solid	ExtChrom	514313
160-42413-13	HPPG-SFU-TU-115A-011	Total/NA	Solid	ExtChrom	514313
160-42413-23	HPPG-SFU-TU-115A-021	Total/NA	Solid	ExtChrom	514362
MB 160-515918/1-A	Method Blank	Total/NA	Solid	ExtChrom	
LCS 160-515918/2-A	Lab Control Sample	Total/NA	Solid	ExtChrom	

Prep Batch: 519394

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-42413-3	HPPG-SFU-TU-115A-001	Total/NA	Solid	DPS-7	514313
160-42413-13	HPPG-SFU-TU-115A-011	Total/NA	Solid	DPS-7	514313
160-42413-23	HPPG-SFU-TU-115A-021	Total/NA	Solid	DPS-7	514362
MB 160-519394/23-A	Method Blank	Total/NA	Solid	DPS-7	
LCS 160-519394/1-A	Lab Control Sample	Total/NA	Solid	DPS-7	

Eurofins TestAmerica, St. Louis

Tracer/Carrier Summary

Client: Aptim Federal Services LLC
Project/Site: HPNS-Parcel G 501197

Job ID: 160-42413-1
SDG: GJ46599751

Method: 905 - Strontium-90 (GFPC)

Matrix: Solid

Prep Type: Total/NA

Lab Sample ID	Client Sample ID	Percent Yield (Acceptance Limits)	
		Sr (40-110)	Y (40-110)
160-42413-3	HPPG-SFU-TU-115A-001	88.1	93.5
160-42413-13	HPPG-SFU-TU-115A-011	85.2	93.2
160-42413-23	HPPG-SFU-TU-115A-021	79.4	92.6
LCS 160-519394/1-A	Lab Control Sample	85.3	92.3
MB 160-519394/23-A	Method Blank	84.0	92.6

Tracer/Carrier Legend

Sr = Sr Carrier

Y = Y Carrier

Method: A-01-R - Isotopic Plutonium and Neptunium (Alpha Spectrometry)

Matrix: Solid

Prep Type: Total/NA

Lab Sample ID	Client Sample ID	Percent Yield (Acceptance Limits)	
		Pu-242 (T) (30-110)	
160-42413-3	HPPG-SFU-TU-115A-001	85.2	
160-42413-13	HPPG-SFU-TU-115A-011	82.5	
160-42413-23	HPPG-SFU-TU-115A-021	81.6	
LCS 160-515911/2-A	Lab Control Sample	87.8	
MB 160-515911/1-A	Method Blank	84.5	

Tracer/Carrier Legend

Pu-242 (T) = Pu-242 (T)

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Matrix: Solid

Prep Type: Total/NA

Lab Sample ID	Client Sample ID	Percent Yield (Acceptance Limits)	
		Th-229 (30-110)	
160-42413-3	HPPG-SFU-TU-115A-001	73.0	
160-42413-13	HPPG-SFU-TU-115A-011	75.1	
160-42413-23	HPPG-SFU-TU-115A-021	53.0	
LCS 160-515918/2-A	Lab Control Sample	89.2	
MB 160-515918/1-A	Method Blank	85.4	

Tracer/Carrier Legend

Th-229 = Thorium-229

Eurofins TestAmerica, St. Louis



Environment Testing
America

ANALYTICAL REPORT

Eurofins TestAmerica, St. Louis
13715 Rider Trail North
Earth City, MO 63045
Tel: (314)298-8566

Laboratory Job ID: 160-42462-1
Laboratory Sample Delivery Group: D1189275
Client Project/Site: HPNS-Parcel G 501197

For:
Aptim Federal Services LLC
4005 Port Chicago Hwy, Suite 200
Concord, California 94520

Attn: Rose Condit

Elizabeth M. Hoerchler

Authorized for release by:
8/12/2021 8:57:54 PM
Elizabeth Hoerchler, Project Manager I
Elizabeth.Hoerchler@Eurofinset.com
Designee for
Rhonda Ridenhower, Client Service Manager
(314)298-8566
Rhonda.Ridenhower@Eurofinset.com

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This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

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Case Narrative

Client: Aptim Federal Services LLC
Project/Site: HPNS-Parcel G 501197

Job ID: 160-42462-1
SDG: D1189275

Job ID: 160-42462-1

Laboratory: Eurofins TestAmerica, St. Louis

Narrative

CASE NARRATIVE

Client: Aptim Federal Services LLC

Project: HPNS-Parcel G 501197

Report Number: 160-42462-1

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In some cases, due to interference or analytes present at high concentrations, samples were diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

Eurofins TestAmerica, St. Louis attests to the validity of the laboratory data generated by Eurofins TestAmerica facilities reported herein. All analyses performed by Eurofins TestAmerica facilities were done using established laboratory SOPs that incorporate QA/QC procedures described in the application methods. Eurofins TestAmerica's operations groups have reviewed the data for compliance with the laboratory QA/QC plan, and data have been found to be compliant with laboratory protocols unless otherwise noted below.

The test results in this report meet all NELAP requirements for parameters for which accreditation is required or available. Any exceptions to NELAP requirements are noted in this report. Pursuant to NELAP, this report may not be reproduced, except in full, without the written approval of the laboratory.

Calculations are performed before rounding to avoid round-off errors in calculated results.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the individual sections below.

All solid sample results for Chemistry analyses are reported on an ""as received"" basis unless otherwise indicated by the presence of a % solids value in the method header. All soil/sediment sample results for radiochemistry analyses are based upon sample as dried and disaggregated with the exception of tritium, carbon-14, and iodine-129 by gamma spectroscopy unless requested as wet weight by the client.

Any minimum detectable concentration (MDC), critical value (DLC), or Safe Drinking Water Act detection limit (SDWA DL) is sample-specific unless otherwise stated elsewhere in this narrative.

Radiochemistry sample results are reported with the count date/time applied as the Activity Reference Date.

Reference the chain of custody and condition upon receipt report for any variations on receipt conditions and temperature of samples on receipt.

Manual Integrations were performed only when necessary and are in compliance with the laboratory's standard operating procedure. Detailed information can be found in the raw data section of the level IV report.

This laboratory report is confidential and is intended for the sole use of Eurofins TestAmerica and its client.

RECEIPT

The samples were received on 06/17/2021; the samples arrived in good condition, properly preserved. The temperature of the coolers at receipt was 25.0° C.

STRONTIUM-90 (GFPC)

Case Narrative

Client: Aptim Federal Services LLC
Project/Site: HPNS-Parcel G 501197

Job ID: 160-42462-1
SDG: D1189275

Job ID: 160-42462-1 (Continued)

Laboratory: Eurofins TestAmerica, St. Louis (Continued)

Sample HPPG-SFU-TU115A-B-001 (160-42462-1) was analyzed for Strontium-90 (GFPC) in accordance with EPA 905. The samples were dried on 06/17/2021, prepared on 07/30/2021 and analyzed on 08/11/2021.

Batch 160-518891:

The method blank (MB) z-score associated with Prep Batch 160-518891 is within limits and is stored in the level IV raw data. (MB 160-518891/24-A)

Batch 160-520833:

The method blank (MB) z-score associated with Prep Batch 520833 is within limits and is stored in the level IV raw data. (MB 160-520833/9-A)

The matrix for the method blank (MB), laboratory control sample (LCS) and laboratory control sample duplicate (LCSD) is as close to the following samples as can be reasonably achieved: HPPG-SFU-TU115A-B-001 (160-42462-1). Detailed information can be found in the most current revision of the associated SOP.

Batch 160-516765:

The matrix for the method blank (MB), laboratory control sample (LCS) and laboratory control sample duplicate (LCSD) is as close to the following samples as can be reasonably achieved: HPPG-SFU-TU115A-B-001 (160-42462-1). Detailed information can be found in the most current revision of the associated SOP.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

ISOTOPIC PLUTONIUM (ALPHA SPECTROMETRY)

Sample HPPG-SFU-TU115A-B-001 (160-42462-1) was analyzed for Isotopic Plutonium (Alpha Spectrometry) in accordance with A-01-R. The samples were dried on 06/17/2021, prepared on 06/24/2021 and analyzed on 07/11/2021.

Prep Batch 160-515911:

The matrix for the Method Blank and LCS is as close to the following samples as can be reasonably achieved: HPPG-SFU-TU115A-B-001 (160-42462-1). Detailed information can be found in the most current revision of the associated SOP.

The following sample exhibited a negative result greater in magnitude than the 3 sigma TPU. This occurrence was evaluated and determined to be random in nature. Sporadic occurrences such as this are statistically expected. No further action is required.
HPPG-SFU-TU115A-B-001 (160-42462-1)

The detector (AV107) the sample was counted on failed the pulser resolution check the day after (closing bracket) the sample count. However, the sample tracer resolution was well within QC limits the day of the count. The laboratory does not believe this excursion adversely affects the data. (160-42315-A-3-E DU)

The method blank (MB) z-score is within limits and is stored in the level IV raw data. (MB 160-515911/1-A)

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

ISOTOPIC THORIUM (ALPHA SPECTROMETRY)

Sample HPPG-SFU-TU115A-B-001 (160-42462-1) was analyzed for Isotopic Thorium (Alpha Spectrometry) in accordance with DOE A01R_Th. The samples were dried on 06/17/2021, prepared on 06/24/2021 and analyzed on 07/08/2021.

Prep batch 160-515918

The matrix for the Method Blank and LCS is as close to the following samples as can be reasonably achieved: HPPG-SFU-TU115A-B-001 (160-42462-1). Detailed information can be found in the most current revision of the associated SOP.

The z-score was >3 for Thorium 232 in the method blank due to the activity being >MDC. However the detection goal was met and the activity was below the RL for the affected isotope indicating no adverse effect to the data. (MB 160-515918/1-A)

A blank population correction was applied to account for contributions to the analyte count rate from sources other than the sample itself. Interferences may include, but are not limited to, impurities in reagents, tracers, or glassware, or effects due to the measurement process.

Case Narrative

Client: Aptim Federal Services LLC
Project/Site: HPNS-Parcel G 501197

Job ID: 160-42462-1
SDG: D1189275

Job ID: 160-42462-1 (Continued)

Laboratory: Eurofins TestAmerica, St. Louis (Continued)

HPPG-SFU-TU115A-B-001 (160-42462-1), (LCS 160-515918/2-A), (MB 160-515918/1-A), (160-42315-A-3-F) and (160-42315-A-3-G DU)

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

RADIUM-226 BY GAMMA SPEC (21 DAY INGROWTH)

Sample HPPG-SFU-TU115A-B-001 (160-42462-1) was analyzed for Radium-226 by gamma spec (21 day ingrowth) in accordance with EPA GA_01_R. The samples were dried on 06/17/2021, prepared on 06/21/2021 and analyzed on 07/12/2021.

Batch 160-515241:

The matrix for the Method Blank and LCS is as close to the following samples as can be reasonably achieved: HPPG-SFU-TU115A-B-001 (160-42462-1). Detailed information can be found in the most current revision of the associated SOP.

The method blank (MB) z-score associated with Prep Batch 160-515241 is within limits and is stored in the level IV raw data. (MB 160-515241/1-A)

Many isotopes requested for analysis do not have any gamma emissions, or the gamma emissions they do have are very poor. Often, such analytes are reported by gamma spectrometry assuming secular equilibrium with a longer-lived parent. The client should ensure that such inference is acceptable for their sample based upon process knowledge. The following assumptions were made for this report:
Inferred from Reported to Analyte

Th-234	Pa-234
Th-234	U-238
Pb-210	Po-210
Pb-210	Bi-210
Cs-137	Ba-137m
Pb-212	Po-216
Xe-131m	Xe-131
Sb-125	Te-125m
Ag-108m	Ag-108
Rh-106	Ru-106
Pb-212	Th-228
Pb-212	Ra-224
U-235	Th-231
Ac-228	Th-232
Ac-228	Ra-228
Th-227	Ra-223
Th-227	Ac-227
Th-227	Bi-211
Th-227	Pb-211
Bi-214	Ra-226

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.



CHAIN OF CUSTODY

Ref. Document # 501197RSY-076

Page 1 of 2

APTIM Federal Services, LLC

4005 Port Chicago Hwy
Concord, CA 94520Project Manager: Lisa Bercik
Phone #: (619)213-3389Send Report to: Rose Condit
Phone/Fax Number: 415-987-0760
Address: 4005 Port Chicago Hwy

Sample Lead: Rizzo, Trevor

Sample Tech(s): John Naumann
Stacy Hatch

Page 6 of 18

Project Number: 501197 Project Name: Hunters Point Naval Shipyard: Parcel G Remedial Action Project Location: San Francisco, CA Purchase Order #: 1159058 Shipment/Pickup Date: 6/15/2021 Waybill Number: 4957 0325 9386 Lab Destination: Test America (St. Louis Lab) 13715 Rider Trail North Earth City, MO 63046				Analysis Requested													
				Gamma Spec (EPA 901.1 M) - Full 21 day ingrowth gamma	Strontium-90 (EPA 905 MOD)	Isotopic Th(228, 230, 232)	Isotopic Pu (238, 239/240)	Dose Rate uR/Hr	Evidence Bag ID	Comment							
Lab Contact Name/ph # Rhoeda Ridenbower (314)298-8566				Matrix	# of Containers	Preservatives (water)											
						Preservatives (soil)											
						Container Type											
Sample ID	Date	Time	Method	HPPG-SFU-TU115A-B-001	6/15/2021	13:22	G	SO	1	16 oz. plastic jar	X	X	X	X	3	D1189275	

Special Instructions:

21 day ingrowth results only

Turanaround Time:	3-day <input type="checkbox"/>	10-Day <input type="checkbox"/>	28-day <input type="checkbox"/>	Other <input type="checkbox"/>	Level of QC Required:	I <input type="checkbox"/>	II <input type="checkbox"/>	III <input type="checkbox"/>	Project Specific
Method Codes C = Composite G = Grab Matrix Codes: DW = Drinking Water So = Soil; GW = Ground Water; SL = Sludge; WW = Waste Water; CP = Chip Samples; A = Air; ABS = Asbestos; PO = Pipe Opening									

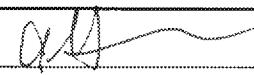
Relinquished By: Relinquisher Signature: Relinquish Date Time: Received By: Received Signature: Receive Date Time:

Rizzo, Trevor		06/15/2021 14:24	SHIPPEDTOLAB		6/17/21 09:20
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*** Last 3 transfers shown above - Complete list of transfers on last page ***

All Transfers for COC 501197RSY-076

Page 2 of 2

Relinquished By:	Relinquisher Signature:	Relinquish Date Time:	Received By:	Received Signature:	Receive Date Time:
Rizzo, Trevor		06/15/2021 14:24	SHIPPEDTOLAB		06/17/21 09:20



Login Sample Receipt Checklist

Client: Aptim Federal Services LLC

Job Number: 160-42462-1

SDG Number: D1189275

Login Number: 42462

List Source: Eurofins TestAmerica, St. Louis

List Number: 1

Creator: Worthington, Sierra M

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	N/A	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Definitions/Glossary

Client: Aptim Federal Services LLC
Project/Site: HPNS-Parcel G 501197

Job ID: 160-42462-1
SDG: D1189275

Qualifiers

Rad Qualifier	Qualifier Description
U	Undetected at the Limit of Detection.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
%	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CFU	Colony Forming Unit
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)
TNTC	Too Numerous To Count

Method Summary

Client: Aptim Federal Services LLC
Project/Site: HPNS-Parcel G 501197

Job ID: 160-42462-1
SDG: D1189275

Method	Method Description	Protocol	Laboratory
905	Strontium-90 (GFPC)	EPA	TAL SL
A-01-R	Isotopic Plutonium and Neptunium (Alpha Spectrometry)	DOE	TAL SL
A-01-R	Isotopic Thorium (Alpha Spectrometry)	DOE	TAL SL
GA-01-R	Radium-226 & Other Gamma Emitters (GS)	DOE	TAL SL
DPS-7	Preparation, Digestion/Precipitate Separation (7-Day In-Growth)	None	TAL SL
Dry and Grind	Preparation, Dry and Grind	None	TAL SL
ExtChrom	Preparation, Extraction Chromatography Resin Actinide Separation	None	TAL SL
Fill_Geo-21	Fill Geometry, 21-Day In-Growth	None	TAL SL

Protocol References:

DOE = U.S. Department of Energy

EPA = US Environmental Protection Agency

None = None

Laboratory References:

TAL SL = Eurofins TestAmerica, St. Louis, 13715 Rider Trail North, Earth City, MO 63045, TEL (314)298-8566

Sample Summary

Client: Aptim Federal Services LLC
Project/Site: HPNS-Parcel G 501197

Job ID: 160-42462-1
SDG: D1189275

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
160-42462-1	HPPG-SFU-TU115A-B-001	Solid	06/15/21 13:22	06/17/21 09:20

Client Sample Results

Client: Aptim Federal Services LLC
Project/Site: HPNS-Parcel G 501197

Job ID: 160-42462-1
SDG: D1189275

Client Sample ID: HPPG-SFU-TU115A-B-001

Lab Sample ID: 160-42462-1

Date Collected: 06/15/21 13:22

Matrix: Solid

Date Received: 06/17/21 09:20

Method: 905 - Strontium-90 (GFPC)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Strontium-90	0.143		0.164	0.165	0.331	0.123	pCi/g	07/30/21 14:42	08/11/21 14:36	1
<i>Carrier</i>	%Yield	Qualifier	<i>Limits</i>					<i>Prepared</i>	<i>Analyzed</i>	<i>Dil Fac</i>
Sr Carrier	86.2		40 - 110					07/30/21 14:42	08/11/21 14:36	1
Y Carrier	92.9		40 - 110					07/30/21 14:42	08/11/21 14:36	1

Method: A-01-R - Isotopic Plutonium and Neptunium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Plutonium-238	-0.0383	U	0.0217	0.0219	0.100	0.0232	pCi/g	06/24/21 15:36	07/11/21 12:50	1
Plutonium-239/240	-0.0256	U	0.0170	0.0172	0.100	0.0185	pCi/g	06/24/21 15:36	07/11/21 12:50	1
<i>Tracer</i>	%Yield	Qualifier	<i>Limits</i>					<i>Prepared</i>	<i>Analyzed</i>	<i>Dil Fac</i>
Pu-242 (T)	82.2		30 - 110					06/24/21 15:36	07/11/21 12:50	1

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Thorium-228	0.411		0.0776	0.0849	0.250	0.0340	pCi/g	06/24/21 17:12	07/08/21 22:12	1
Thorium-230	0.257		0.0722	0.0753	0.250	0.0352	pCi/g	06/24/21 17:12	07/08/21 22:12	1
Thorium-232	0.403		0.0642	0.0725	0.250	0.0118	pCi/g	06/24/21 17:12	07/08/21 22:12	1
<i>Tracer</i>	%Yield	Qualifier	<i>Limits</i>					<i>Prepared</i>	<i>Analyzed</i>	<i>Dil Fac</i>
Thorium-229	67.6		30 - 110					06/24/21 17:12	07/08/21 22:12	1

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Actinium 228	0.720		0.184	0.198		0.0291	pCi/g	06/21/21 16:29	07/12/21 07:13	1
Actinium-227	-0.0804	U	0.564	0.564		0.347	pCi/g	06/21/21 16:29	07/12/21 07:13	1
Americium-241	0.0750	U	0.181	0.181		0.147	pCi/g	06/21/21 16:29	07/12/21 07:13	1
Bismuth-212	0.219	U	0.478	0.479		0.362	pCi/g	06/21/21 16:29	07/12/21 07:13	1
Bismuth-214	0.562		0.156	0.167		0.0612	pCi/g	06/21/21 16:29	07/12/21 07:13	1
Cesium-137	0.0324	U	0.0758	0.0759	0.0700	0.0601	pCi/g	06/21/21 16:29	07/12/21 07:13	1
Lead-210	0.907	U	1.64	1.64		1.05	pCi/g	06/21/21 16:29	07/12/21 07:13	1
Lead-212	0.583		0.105	0.122		0.0511	pCi/g	06/21/21 16:29	07/12/21 07:13	1
Lead-214	0.549		0.130	0.141		0.0572	pCi/g	06/21/21 16:29	07/12/21 07:13	1
Potassium-40	7.70		1.27	1.49		0.269	pCi/g	06/21/21 16:29	07/12/21 07:13	1
Protactinium-231	0.589	U	1.86	1.87		2.04	pCi/g	06/21/21 16:29	07/12/21 07:13	1
Protactinium-234	0.0977	U	0.297	0.297		0.233	pCi/g	06/21/21 16:29	07/12/21 07:13	1
Radium-226	0.562		0.156	0.167	0.200	0.0612	pCi/g	06/21/21 16:29	07/12/21 07:13	1
Radium-228	0.720		0.184	0.198		0.0291	pCi/g	06/21/21 16:29	07/12/21 07:13	1
Thallium-208	0.0135	U	0.0211	0.0212		0.0772	pCi/g	06/21/21 16:29	07/12/21 07:13	1
Thorium 228	0.583		0.105	0.122		0.0511	pCi/g	06/21/21 16:29	07/12/21 07:13	1
Thorium-232	0.720		0.184	0.198		0.0291	pCi/g	06/21/21 16:29	07/12/21 07:13	1
Thorium-234	-0.232	U	0.987	0.988		0.819	pCi/g	06/21/21 16:29	07/12/21 07:13	1

Eurofins TestAmerica, St. Louis

Client Sample Results

Client: Aptim Federal Services LLC
Project/Site: HPNS-Parcel G 501197

Job ID: 160-42462-1
SDG: D1189275

Client Sample ID: HPPG-SFU-TU115A-B-001

Lab Sample ID: 160-42462-1

Date Collected: 06/15/21 13:22
Date Received: 06/17/21 09:20

Matrix: Solid

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS) (Continued)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			(2 σ +/-)	(2 σ +/-)						
Uranium-235	0.140	U	0.305	0.306		0.396	pCi/g	06/21/21 16:29	07/12/21 07:13	1
Uranium-238	-0.232	U	0.987	0.988		0.819	pCi/g	06/21/21 16:29	07/12/21 07:13	1

QC Sample Results

Client: Aptim Federal Services LLC
Project/Site: HPNS-Parcel G 501197

Job ID: 160-42462-1
SDG: D1189275

Method: 905 - Strontium-90 (GFPC)

Lab Sample ID: MB 160-520833/9-A

Matrix: Solid

Analysis Batch: 522140

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 520833

Analyte	MB	MB	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
	Result	Qualifier								
Strontium-90	-0.1730	U	0.178	0.179	0.331	0.160	pCi/g	07/30/21 14:42	08/11/21 14:36	1
Carrier										
<i>Sr Carrier</i> 88.8 40 - 110 07/30/21 14:42 08/11/21 14:36 1										
<i>Y Carrier</i> 88.7 40 - 110 07/30/21 14:42 08/11/21 14:36 1										

Lab Sample ID: LCS 160-520833/1-A

Matrix: Solid

Analysis Batch: 522138

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 520833

Analyte	MB	MB	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	LOQ	DLC	Unit	%Rec.	Limits
	Result	Qualifier									
Strontium-90			7.64	6.530		0.730	0.331	0.124	pCi/g	85	75 - 125
Carrier											
<i>Sr Carrier</i> 86.4 40 - 110 06/24/21 17:12 07/08/21 22:12 1											
<i>Y Carrier</i> 90.8 40 - 110 06/24/21 17:12 07/08/21 22:12 1											

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Lab Sample ID: MB 160-515918/1-A

Matrix: Solid

Analysis Batch: 517637

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 515918

Analyte	MB	MB	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
	Result	Qualifier								
Thorium-228	0.05797		0.0471	0.0473	0.250	0.0311	pCi/g	06/24/21 17:12	07/08/21 22:12	1
Thorium-230	-0.0001991	U	0.0417	0.0417	0.250	0.0256	pCi/g	06/24/21 17:12	07/08/21 22:12	1
Thorium-232	0.1117		0.0343	0.0356	0.250	0.0122	pCi/g	06/24/21 17:12	07/08/21 22:12	1
Tracer										
<i>Thorium-229</i> 85.4 30 - 110 06/24/21 17:12 07/08/21 22:12 1										

Lab Sample ID: LCS 160-515918/2-A

Matrix: Solid

Analysis Batch: 517638

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 515918

Analyte	MB	MB	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	LOQ	DLC	Unit	%Rec.	Limits
	Result	Qualifier									
Thorium-230			24.5	22.77		2.00	0.250	0.0406	pCi/g	93	81 - 118
Tracer											
<i>Thorium-229</i> 89.2 30 - 110 06/24/21 17:12 07/08/21 22:12 1											

Eurofins TestAmerica, St. Louis

QC Sample Results

Client: Aptim Federal Services LLC
Project/Site: HPNS-Parcel G 501197

Job ID: 160-42462-1
SDG: D1189275

Method: A-01-R - Isotopic Plutonium and Neptunium (Alpha Spectrometry)

Lab Sample ID: MB 160-515911/1-A

Matrix: Solid

Analysis Batch: 518094

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 515911

Analyte	MB	MB	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
	Result	Qualifier								
Plutonium-238	-0.02124	U	0.0300	0.0301	0.100	0.0271	pCi/g	06/24/21 15:36	07/11/21 12:50	1
Plutonium-239/240	-0.02551	U	0.0190	0.0191	0.100	0.0198	pCi/g	06/24/21 15:36	07/11/21 12:50	1
Tracer	MB	MB	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac		
	Pu-242 (T)	84.5			30 - 110	06/24/21 15:36	07/11/21 12:50			

Lab Sample ID: LCS 160-515911/2-A

Matrix: Solid

Analysis Batch: 518095

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 515911

Analyte	MB	MB	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	LOQ	DLC	Unit	%Rec	%Rec. Limits
	Result	Qualifier									
Plutonium-238	2.60			2.781		0.278	0.100	0.0258	pCi/g	107	80 - 125
Plutonium-239/2	2.64			2.671		0.268	0.100	0.0158	pCi/g	101	81 - 125
Tracer	MB	MB	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac			
	Pu-242 (T)	87.8			30 - 110	06/24/21 15:36	07/11/21 12:50				

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Lab Sample ID: MB 160-515241/1-A

Matrix: Solid

Analysis Batch: 518258

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 515241

Analyte	MB	MB	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
	Result	Qualifier								
Actinium 228	0.06269		0.0561	0.0564		0.0292	pCi/g	06/21/21 16:29	07/12/21 07:50	1
Actinium-227	0.1490	U	0.302	0.303		0.167	pCi/g	06/21/21 16:29	07/12/21 07:50	1
Americium-241	-0.04188	U	0.101	0.101		0.0801	pCi/g	06/21/21 16:29	07/12/21 07:50	1
Bismuth-212	0.2769	U	0.651	0.651		0.507	pCi/g	06/21/21 16:29	07/12/21 07:50	1
Bismuth-214	-0.09797	U	0.148	0.148		0.129	pCi/g	06/21/21 16:29	07/12/21 07:50	1
Cesium-137	0.01799	U	0.0321	0.0322	0.0700	0.0232	pCi/g	06/21/21 16:29	07/12/21 07:50	1
Lead-210	0.01570	U	0.830	0.830		0.682	pCi/g	06/21/21 16:29	07/12/21 07:50	1
Lead-212	0.002127	U	0.0785	0.0785		0.0645	pCi/g	06/21/21 16:29	07/12/21 07:50	1
Lead-214	-0.07995	U	0.151	0.152		0.0841	pCi/g	06/21/21 16:29	07/12/21 07:50	1
Potassium-40	0.1578	U	0.439	0.440		0.323	pCi/g	06/21/21 16:29	07/12/21 07:50	1
Protactinium-231	-0.0000003	U	2.12	2.12		1.74	pCi/g	06/21/21 16:29	07/12/21 07:50	1
²²⁶										
Protactinium-234	0.08717	U	0.152	0.152		0.127	pCi/g	06/21/21 16:29	07/12/21 07:50	1
Radium-226	-0.09797	U	0.148	0.148	0.200	0.129	pCi/g	06/21/21 16:29	07/12/21 07:50	1
Radium-228	0.06269		0.0561	0.0564		0.0292	pCi/g	06/21/21 16:29	07/12/21 07:50	1
Thallium-208	-0.02414	U	0.0505	0.0505		0.0334	pCi/g	06/21/21 16:29	07/12/21 07:50	1
Thorium 228	0.002127	U	0.0785	0.0785		0.0645	pCi/g	06/21/21 16:29	07/12/21 07:50	1
Thorium-232	0.06269		0.0561	0.0564		0.0292	pCi/g	06/21/21 16:29	07/12/21 07:50	1
Thorium-234	0.2229	U	0.460	0.461		0.470	pCi/g	06/21/21 16:29	07/12/21 07:50	1
Uranium-235	0.04516	U	0.0951	0.0952		0.255	pCi/g	06/21/21 16:29	07/12/21 07:50	1
Uranium-238	0.2229	U	0.460	0.461		0.470	pCi/g	06/21/21 16:29	07/12/21 07:50	1

Eurofins TestAmerica, St. Louis

QC Sample Results

Client: Aptim Federal Services LLC
Project/Site: HPNS-Parcel G 501197

Job ID: 160-42462-1
SDG: D1189275

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Lab Sample ID: LCS 160-515241/2-A

Client Sample ID: Lab Control Sample

Matrix: Solid

Prep Type: Total/NA

Analysis Batch: 518256

Prep Batch: 515241

Analyte	Spike Added	LCS		Total		LOQ	DLC	Unit	%Rec	%Rec. Limits
		Result	Qual	Uncert. (2σ+/-)						
Americium-241	96.3	101.7		10.6		0.325	pCi/g		106	87 - 116
Cesium-137	26.4	24.90		2.65	0.0700	0.0865	pCi/g		94	87 - 120
Cobalt-60	8.78	8.121		0.858		0.0456	pCi/g		93	87 - 115

QC Association Summary

Client: Aptim Federal Services LLC
Project/Site: HPNS-Parcel G 501197

Job ID: 160-42462-1
SDG: D1189275

Rad

Leach Batch: 514724

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-42462-1	HPPG-SFU-TU115A-B-001	Total/NA	Solid	Dry and Grind	

Prep Batch: 515241

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-42462-1	HPPG-SFU-TU115A-B-001	Total/NA	Solid	Fill_Geo-21	514724
MB 160-515241/1-A	Method Blank	Total/NA	Solid	Fill_Geo-21	
LCS 160-515241/2-A	Lab Control Sample	Total/NA	Solid	Fill_Geo-21	

Prep Batch: 515911

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-42462-1	HPPG-SFU-TU115A-B-001	Total/NA	Solid	ExtChrom	514724
MB 160-515911/1-A	Method Blank	Total/NA	Solid	ExtChrom	
LCS 160-515911/2-A	Lab Control Sample	Total/NA	Solid	ExtChrom	

Prep Batch: 515918

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-42462-1	HPPG-SFU-TU115A-B-001	Total/NA	Solid	ExtChrom	514724
MB 160-515918/1-A	Method Blank	Total/NA	Solid	ExtChrom	
LCS 160-515918/2-A	Lab Control Sample	Total/NA	Solid	ExtChrom	

Prep Batch: 520833

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-42462-1	HPPG-SFU-TU115A-B-001	Total/NA	Solid	DPS-7	514724
MB 160-520833/9-A	Method Blank	Total/NA	Solid	DPS-7	
LCS 160-520833/1-A	Lab Control Sample	Total/NA	Solid	DPS-7	

Eurofins TestAmerica, St. Louis

Tracer/Carrier Summary

Client: Aptim Federal Services LLC
Project/Site: HPNS-Parcel G 501197

Job ID: 160-42462-1
SDG: D1189275

Method: 905 - Strontium-90 (GFPC)

Matrix: Solid

Prep Type: Total/NA

Lab Sample ID	Client Sample ID	Percent Yield (Acceptance Limits)	
		Sr (40-110)	Y (40-110)
160-42462-1	HPPG-SFU-TU115A-B-001	86.2	92.9
LCS 160-520833/1-A	Lab Control Sample	86.4	90.8
MB 160-520833/9-A	Method Blank	88.8	88.7

Tracer/Carrier Legend

Sr = Sr Carrier
Y = Y Carrier

Method: A-01-R - Isotopic Plutonium and Neptunium (Alpha Spectrometry)

Matrix: Solid

Prep Type: Total/NA

Lab Sample ID	Client Sample ID	Percent Yield (Acceptance Limits)	
		Pu-242 (T) (30-110)	
160-42462-1	HPPG-SFU-TU115A-B-001	82.2	
LCS 160-515911/2-A	Lab Control Sample	87.8	
MB 160-515911/1-A	Method Blank	84.5	

Tracer/Carrier Legend

Pu-242 (T) = Pu-242 (T)

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Matrix: Solid

Prep Type: Total/NA

Lab Sample ID	Client Sample ID	Percent Yield (Acceptance Limits)	
		Th-229 (30-110)	
160-42462-1	HPPG-SFU-TU115A-B-001	67.6	
LCS 160-515918/2-A	Lab Control Sample	89.2	
MB 160-515918/1-A	Method Blank	85.4	

Tracer/Carrier Legend

Th-229 = Thorium-229

Eurofins TestAmerica, St. Louis